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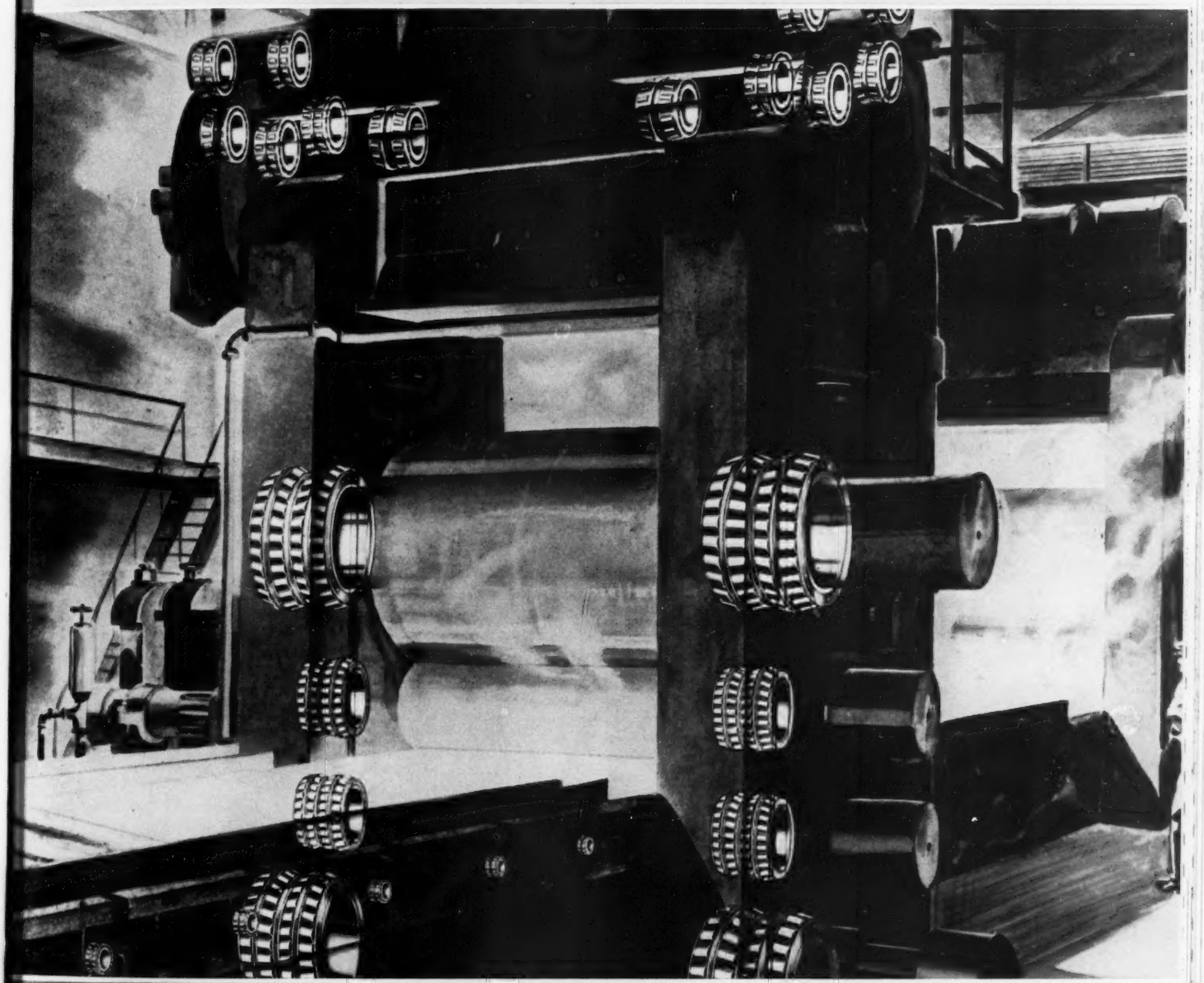
STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 55



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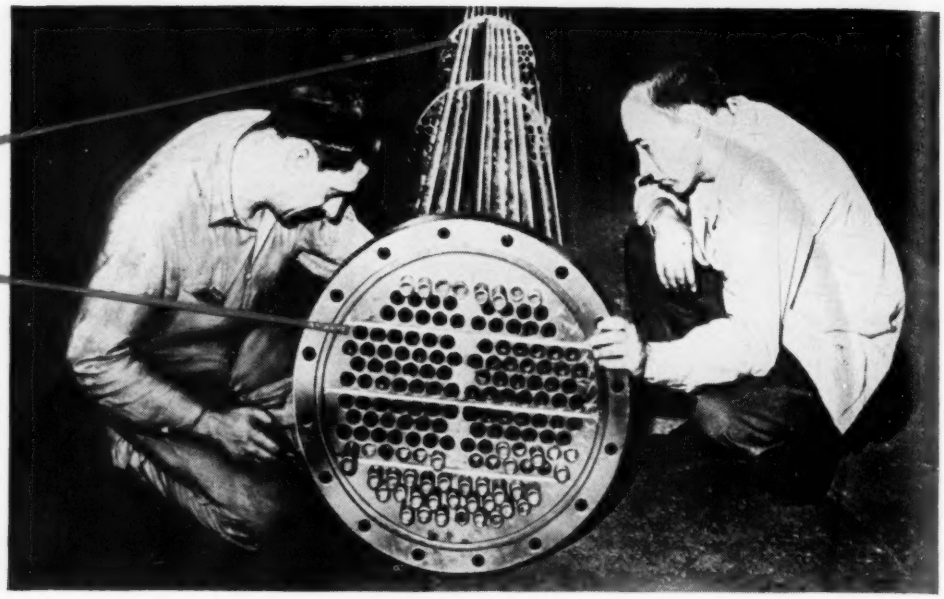

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Multiple Welding Procedures Improve Body Weld Quality

Organic Finishes for Metal Products

Industrial Hygiene Laboratory Evaluates Health Hazards

STEEL

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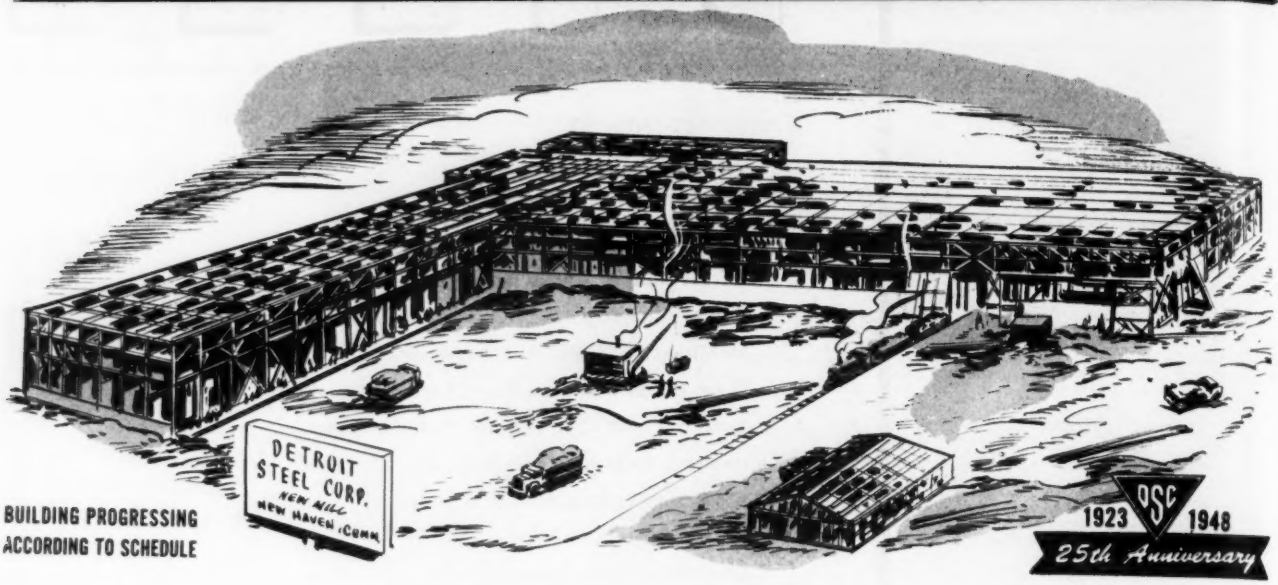

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June 7, 1948

Danger Ahead!

It is no accident that discussion of steel pricing dominated the annual meeting of the American Iron & Steel Institute two weeks ago and the annual convention of the National Association of Purchasing Agents last week. The subject is vitally important to sellers and buyers alike.

The pertinent question is whether or not pricing on an f.o.b. mill basis would be preferable to the present multiple basing point system. Government spokesmen say that f.o.b. mill will prevent monopoly, tend to decentralize industry and benefit a majority of customers. Most producers and consumers contend that the reverse is true on all three counts.

The weight of experience is on the side of the latter group. There is nothing in basing point pricing that affords the opportunity for monopoly that would not be presented to favorably located sellers under an f.o.b. mill system.

As for decentralization, f.o.b. mill—instead of dispersing fabricating and manufacturing plants, as predicted by government spokesmen—actually would tend to concentrate these consumers in the vicinity of their sources of supply. If one doubts this, let him remember that while there are about 30,000 direct customers of steel mills and about 300,000 customers of steel warehouses there are only a few dozen mill suppliers of most steel products and only a few thousand warehouses. The initial effect of f.o.b. mill would be to tempt customers to cluster about existing mills. Later a few new mills might gravitate toward centers of heavy consumption, but the net result would be more concentration than dispersal.

To change from basing points to f.o.b. mill would favor some customers at the expense of others. Any realistic appraisal of this aspect would prove conclusively that more customers would be harmed than would be benefited. If anyone doubts this statement, he is advised to study the list of mill customers by states and compare it with steel mill capacities of nearby steel producing centers. More buyers are distant from mills than are conveniently near them.

All in all, change to f.o.b. mill would impose drastic and dangerous adjustments upon industry. If the Federal Trade Commission persists in its drive for f.o.b. mill, Congress will be fully justified in acting to protect the public interest.

* * *

DIFFERENT SITUATION: While industrialists are debating the question of whether or not the General Motors wage settlement is likely to become the pattern for other third-round negotiations, it is well to note that in one important respect the wage problem which confronted the world's largest automobile manufacturer differs from that faced by many companies in some other industries.

In most of the major industries wages have increased more since 1940 than has the cost of living. That is one reason why in recent months some union spokesmen have been stressing profits and "ability to pay" more than the need of adjustment to compensate for the rising cost of living. In the steel industry, for instance, where no third-round wage increase was granted this spring, wages already had advanced 80 per cent since 1940, whereas the cost of living in the same period had increased only 69 per cent.

It happens that in 1940 wages in the automotive industry were rather high in relation to those in other major industries, including steel. Consequently, when third-round negotiations came up a few weeks ago, the advances in

(OVER)

wages since 1940 had not yet caught up with increases in living costs. Of the 11-cent increase per hour granted by GM, 8 cents was a "cost of living adjustment" to compensate for this lag.

This difference in situations must be taken into account if attempts are to be made to adapt the GM formula to wage settlements into other industries. —pp. 64, 77

* * *

PREPAREDNESS, 1948: A 46-page pamphlet entitled "Guide for Joint Industry-Military Procurement Planning," issued by the Munitions Board, attempts to answer questions as to how manufacturers can best prepare their plants for mobilization in event of a major emergency.

Its questions deal primarily with the extent to which a company with potentials for production of wartime products can shift from a peacetime to a wartime basis on short notice. It checks the adequacy of facilities, services and organization to meet the expected requirements of another war.

If your plant participated importantly in work for World War II, you should be familiar with the program outlined in this guide to present-day preparedness. —p. 63

* * *

A FUTURE OF GIANTS?: In an unusually forceful address at the 33rd annual convention of the National Association of Purchasing Agents, Hiland G. Batcheller, president of Allegheny Ludlum Steel Corp., made a number of comments that could be characterized as pessimistic, if it were not for the fact that they are sound and realistic.

He said that it is becoming increasingly obvious that scrap may never again be plentiful. Present indications bear out this prediction and it is a problem that cannot be evaded.

He also said that the outlook for the small non-integrated mill is bleak. From the economic standpoint, he continued, there is every probability that steel mills will become progressively larger, more complex and more costly. "The steel industry is no longer a place for an entrepreneur with a few million dollars. Rather, invested capital must be calculated in terms of hundreds of millions of dollars."

This sober prediction is fully substantiated by present experience, but we hope some unknown enterprising go-getter of the future will explode this prophecy by starting an enduring steel establishment on a shoestring. An industry composed solely of giants means government supervision and disaster. —p. 66

* * *

ASME AT MILWAUKEE: Time was when an engineer intending to attend a major meeting of the American Society of Mechanical Engineers could bank heavily on the expectation that the program would deal primarily with subjects pertaining to steam power, time studies and similar enduring topics of major interest to the profession.

Last week's semi-annual meeting at Milwaukee was noteworthy in that it reflected the society's transition from the accepted fare of earlier days to timely and pertinent subjects of the atomic age. High-lighted on the program were discussions of nuclear energy, rocket propulsion, materials handling, gas turbines, electronic machines, education for industry and production machine shop practice.

Appropriately the program was influenced strongly by consideration of the noteworthy achievements of engineers in the locale of the meeting. The prominent position of Milwaukee and its environments in the production of heavy machinery and equipment was reflected favorably throughout the proceedings. —p. 67

* * *

RAPID TUBE CUTTING: To cut tubing of any commercial diameter up to 4 inches and of any ordinary wall thickness at speeds up to 12,000 cuts per hour seems incredible. The feat would be all the more remarkable if the rapid cutting could be performed without distortion, with little or no burr, with narrow kerf and to extremely close limits as to length.

Nevertheless, tube cutting to these exacting specifications is being accomplished by the Grieder method. The tube is firmly clamped by suitable jaws, is opened by a quick pass of a shaper-type blade across the top and is severed by a quick downward "stab" of a thin, spear-shaped tool the point of which enters the slot cut by the shaper blade.

This is a complete departure from the familiar revolving tool, revolving work, sawing and shearing techniques. It is a true cutting operation, the commercial application of which will be watched with unusual interest. —p. 95

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

MOBILIZATION PLANNING— If you want to stay in business during the next war emergency, make plans now to convert to war production. Otherwise you may be denied materials and manpower and forced to suspend. Such is the warning given manufacturers by the Munitions Board last week in issuing a compact guide for mobilization planning (p.63). The board wants you to set up a basic plant mobilization plan, place a well-informed and authoritative executive in charge and get in touch with procurement officials, informing them of what and how much you can produce. Industry's advice on security problems will be sought through a new set of advisory committees—to the National Security Resources Board (p.70).

WAGES— Despite granting of third-round wage increases by two leading auto companies, the basic steel industry is standing pat on its anti-inflation program of denying wage advances and reducing the price of its products (p.64). Meanwhile, economists studying the General Motors settlement with the union, gearing wages to living costs, are finding more disturbing factors (p.77). Many doubt that this agreement will be an industry pattern. Chrysler has settled for a flat 13-cent hourly increase on a two-year contract with a provision for one reopening to discuss wages during the contract period.

BASING POINTS—Members of the Federal Trade Commission appeared before a congressional subcommittee last week to discuss the effects of the recent Cement case and other court decisions on the status of pricing methods. The conference did little to clarify the muddled situation, which now is a top conversational topic wherever business men meet (p. 65). Purchasing agents meeting in New York (p. 66) agreed that a majority of consumers would suffer serious dislocations if the basing point pricing method were outlawed in the steel industry. Legislation to clarify the status of pricing methods is being considered (p. 70) by congressmen.

STEEL DISTRIBUTION— Warning to the steel industry to bring forth a plan to correct maladjustments in steel distribution or face the prospect of mandatory controls was sounded (p. 68) by Senator Wherry, head of the Senate Small Business Committee.

ALLOCATIONS—Details as to product allocations under the atomic energy projects and the heating equipment program have been revealed (p.69). Action on the allocation of pig iron for housing requirements is expected this week. Meanwhile, the Justice Department is being asked for a ruling on whether European aid and national defense requirements may be allocated under the voluntary program.

SHIPPING INADEQUATE— American shipping is dangerously inadequate for the prosecution of a foreign war, according to the chief of naval operations (p. 72). We now have less than half the tonnage of transports and tankers that would be required to wage a campaign of the size of the last war.

FOREIGN—Pressure for nationalization of the British steel industry continues (p. 73), despite the excellent production showing of the industry under adverse conditions. Several Labor Government leaders have reaffirmed their intention to effect the nationalization during the present government. Meanwhile substantial expansion and improvement projects are being undertaken by British steel companies.

SIGNS OF THE TIMES—New Departure Division of General Motors is approaching full operation of its new ball bearing plant (p. 74) at Sandusky, O. . . This is the big week for Ford Motor Co. which Wednesday will unveil its 1949 model (p. 77) . . . Chrysler is losing an extra week's production (p. 77) as result of damage to steam power plant when the recent strike started . . . Both bids for the government's surplus blast furnace at Cleveland have been rejected (p. 80) by the WAA. . . Faster freight cars are the object of a research program being undertaken by railroad equipment manufacturers and American Steel Foundries. . . French steel output is being raised as the raw materials supply improves (p. 73) . . . Coal production, at least temporarily, is proceeding at a high level (p. 82).

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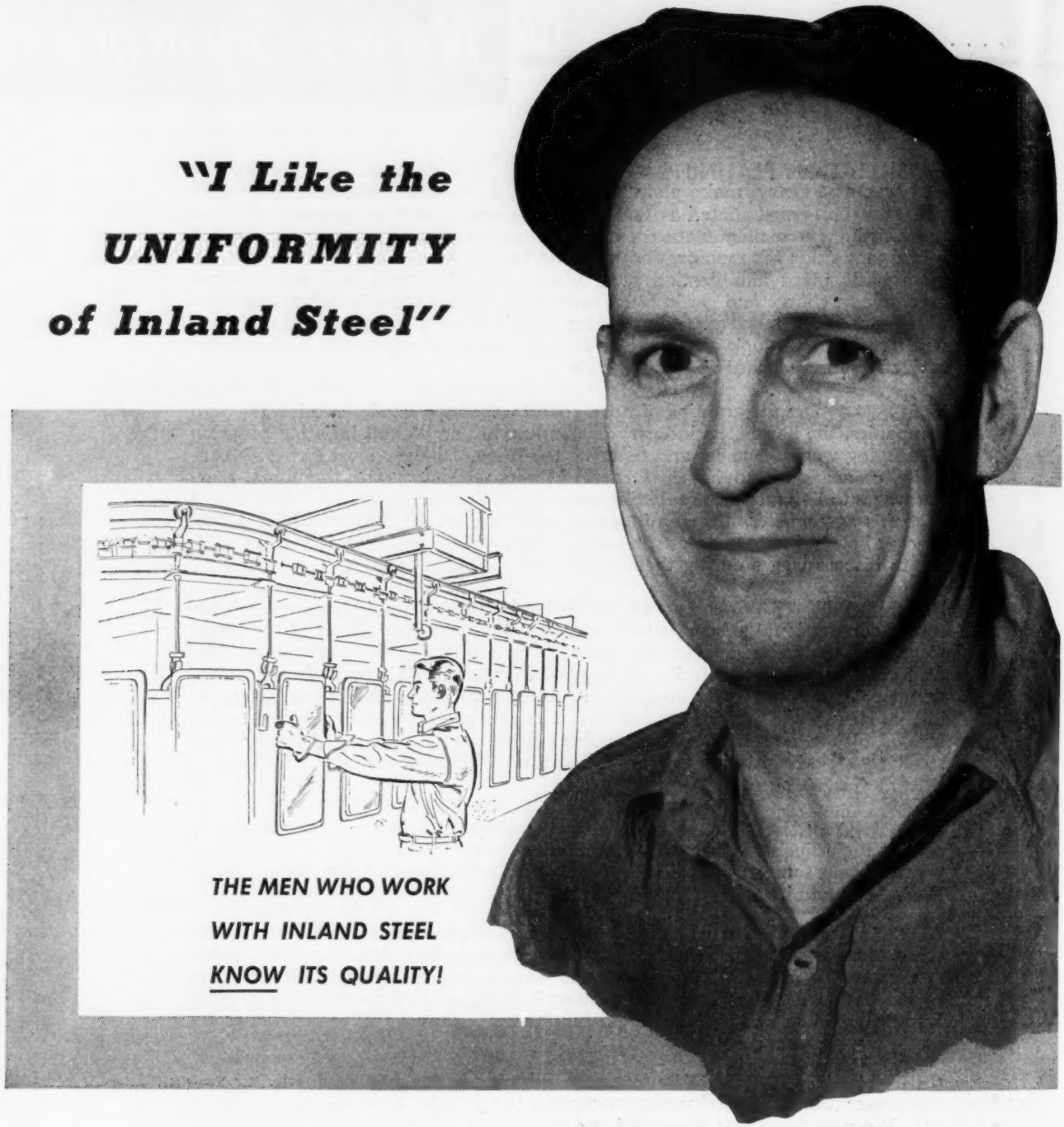

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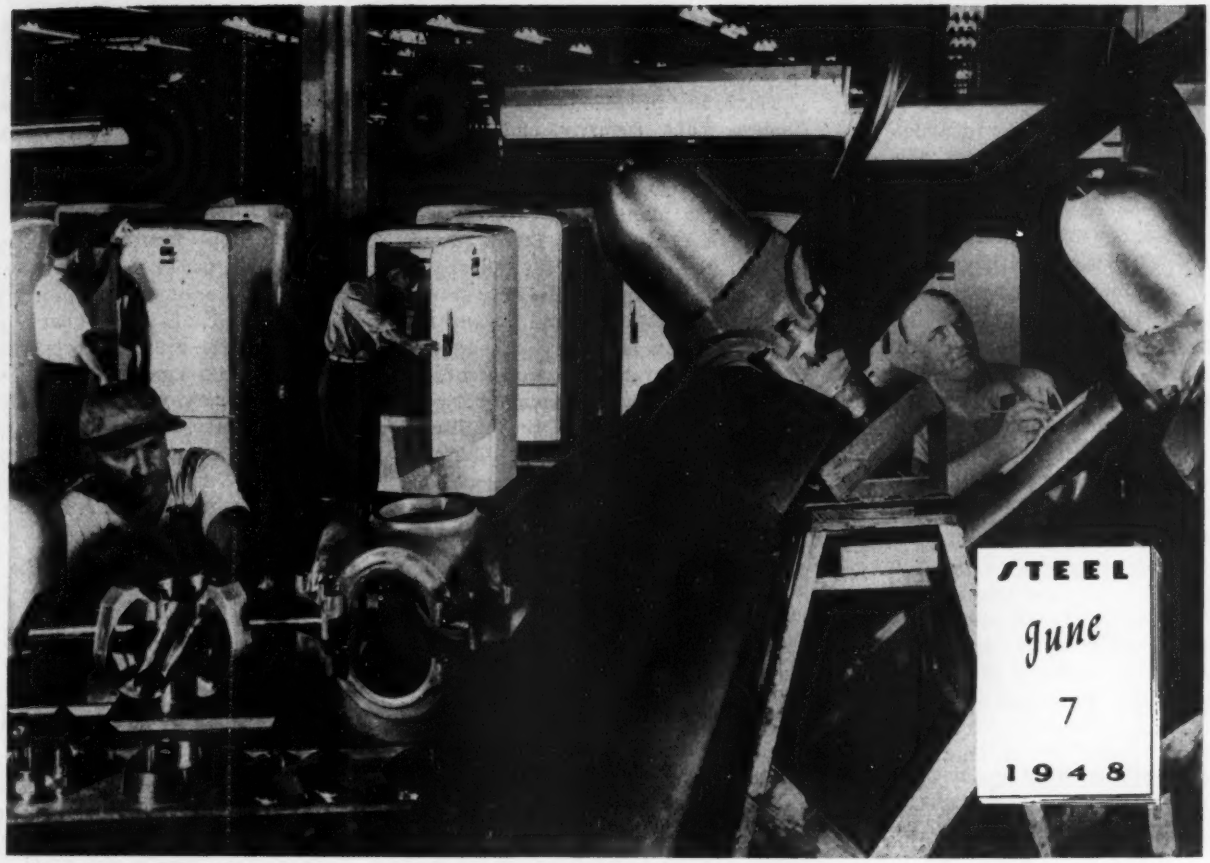


How to prepare for a future war emergency while producing for peace is the problem posed to American industry today. Munitions Board suggests companies take a lesson from their experience in converting and reconverting during the World War II. Photo shows dual operations at a General Motors plant after V-E Day, with refrigerators and aircraft propellers being produced in the same plant

Mobilization Guide Given Industry

Munitions Board warns manufacturers to plan now for future emergency or risk losing materials and manpower if they are unable to convert quickly to war output

HOW manufacturers can best prepare their plants for mobilization in event of a national emergency is set forth in a "Guide for Joint Industry-Military Procurement Planning," a 46-page pamphlet just issued by the Munitions Board.

The board suggests each plant establish a basic plant mobilization plan under a single mobilization director who will keep in touch with military procurement officials. Once such a basic plan is assembled, the board says, it should be a fairly simple matter to keep it up to date.

Swift changes in logistics plans, in military and industrial technology, and in the physical structure of the nation's industrial plant preclude the procurement officers offering blueprints and contracts in advance of the emergency. However, the board points out there are many ways in which the individual company may establish reasonably firm bases for planning its wartime product for a future emergency. Some of these are suggested in a checklist included in the guide.

World War II Suggests Pattern—For example, if a company produced a military item during the past war and military technological developments have not affected that item, that company may be called upon to make the same or similar items in a future emergency.

Certain products, multipurpose components, and intermediate stages of production (such as metal shapes) are essential in either war or peace and would be needed at top production rate in wartime.

Companies which have accepted educational orders, or research and development contracts, or routine peacetime supply contracts with the National Military Establishment may be able to relate this work to their planning for an emergency.

Often, military procurement planning officials will be able to give tips as to what products are likely to be required.

For those who have no other guide, the board suggests that "each industrial plant management should plan to produce at the same production rate as in the month of January, 1944. Wherever this assumption is not appropriate, the base period should be the plant's peak production month during World War II. The general rule as to what product the plant should plan to make should be—where appropriate — approximately the same type of item or items as were produced in the base month selected."

Urges Planning Now—The Munitions Board emphasizes the dangers to plants which fail to make prepa-

rations now for an emergency. "Should you be unprepared in time of emergency, and unable to participate in production of essential goods, there would be no way in which you could be protected; unless you can shift to essential production, your supplies of raw material might be cut off and your labor force drained away. The very existence of your company might hang on your preparedness for the emergency."

The board warns that a war within the next few years probably would not be a brief "push button" affair. Although new weapons undoubtedly would be used, full-scale mobilization and equipping of manpower would still be necessary.

A war within the next few years would probably find this country's economic structure about the same as at present. A manpower shortage would develop at the outset because there is no reservoir of unemployed. Many basic materials, steel, copper, aluminum, rubber, petroleum and others, would be in short supply. Transportation and power would be severely taxed.

On the question of how much of the productive plant would be devoted to war output, the board suggests no more than 50 per cent as the basis for its overall planning.

Preparedness Checklist—A considerable portion of the guide is devoted to a list of questions directed to management of industrial plants to aid them in setting up their own preparedness program. These are intended to be suggestive rather than a hard-and-fast approach. Sample questions:

Has mobilization planning been assigned to a single executive, familiar with the plant's operations and possessing authority to command cooperation?

Is credit available to finance conversion to war production?

Is there a record of materials used by the plant?

What use could be made of substitute materials?

What experience and contact have you had with subcontractors?

Can you cancel peacetime orders?

Has labor been catalogued? Have provisions been made for training and expanding supervisory forces?

Are adequate service facilities available for an expanded labor force?

Have you preserved a record of World War II production techniques for future guidance?

Have you adequate sources for power, fuel, water? Are storage and transportation facilities adequate?

Has your research staff reviewed lists of military items and materials produced in World War II?

Have any provisions been made to insure plant security and damage control?

Planning Officers Listed—If you think your plant could produce war goods, the Munitions Board wants you to get in touch with the appropriate procurement planning office (listed in the guide) and discuss the possibility of having your capacity assigned. Tentative arrangements of this sort are now being made between industrial plants and the military. The board emphasizes that plants as such are not allocated; allocations are made only of capacity to produce a specified item at a specified rate of production.

The board points out that it will be necessary to seek out suppliers of new weapons and other new goods. To aid in this program, a survey will be made of some 22,000 to 25,000 plants to preplan production schedules in consultation with management. Companies are invited to get in touch with the procurement officers to further this program.

Fourth Step—Issuance of the guide is the fourth major step taken by the Munitions Board in planning preparedness. First, the board earmarked for the military certain basic facilities built during the last war. Second, it surveyed machine tools. Third step involved a survey of companies which supplied materiel during World War II and tentative allocation of their productive capacity among the military services.

Twenty thousand copies of the mobilization planning guide have been mailed to manufacturers.

Steel Holds Firm on Wage Line

BASIC steel producers are holding to their anti-inflation program of denying third-round wage increases while reducing steel prices, despite the wage advances granted by two leading auto companies.

Allegheny Ludlum Steel Corp., Pittsburgh, turned down a request by the United Steelworkers for a third-round increase on May 29, soon after Chrysler Corp. settled with the United Auto Workers for a flat 13-cent hourly increase.

At the same time, Allegheny Ludlum, stating it had considered the desirability of keeping questions of a wage increase open for further discussion and negotiation with the union, said: "We have concluded that this would serve no useful purpose and believe that it is in the best interests of all concerned to stabilize our wages at the current rates for one year more." Under the terms of the company's contract with the union, the agreement continues in effect until May 30, 1949, one month longer than the pacts between the union and Big Steel.

Strive for Lower Costs—The company said it recognizes the squeeze on employees' pocketbooks caused by prevailing high prices of food, clothing and other items that enter into the cost of living. Much of this, it said, is due to the earlier postwar wage increases which had inflationary influences.

"The company concurs in the often stated position of the union that the greatest benefit to workers will come through the medium of a drop in prices. We believe that the energies of everyone should be directed to that end. The company can make its contribution only by holding or reducing prices. Our workers can make their contribution by striving for increased productivity. A concerted effort by all factors, not only of the company but of the entire national economy, to produce more at less cost is the surest way to bring the cost of living into realistic balance."

Miners' Strike Cuts April Pig Iron and Steel Output

Due to the adverse effects of the coal miners' strike on blast furnace operations, production of pig iron, ferromanganese and spiegeleisen declined in April to 3,840,398 tons from 5,019,687 tons in March, according to the American Iron & Steel Institute. This brought output for the first four months to 18,893,875 tons compared with 19,589,388 tons for the like 1947 period.

April's production included 3,791,332 tons of pig iron and 49,066 tons of ferromanganese and spiegeleisen. Distribution by districts of the pig iron production was as follows: Pittsburgh-Youngstown, 1,404,839 tons; Chicago, 882,615 tons; eastern, 649,516 tons; Cleveland-Detroit, 452,658 tons; southern, 268,674 tons; and western, 133,030 tons.

Production of steel ingots and steel for castings totaled 6,217,271 tons in April compared with 7,608,135 tons in March, making the total for the first four months 28,238,406 tons against 27,985,607 tons in the like period a year ago.

Clarification Still Lacking

FTC members say Cement decision does not necessarily outlaw basing point pricing systems, nor require f.o.b. mill prices. Oppose new legislation

ASSUMPTIONS that the recent Supreme Court decision in the Cement case outlaws all delivered prices or requires f.o.b. mill prices are unwarranted. This was the opinion of four members of the Federal Trade Commission expressed last week in a conference with the Senate subcommittee on Interstate & Foreign Commerce, Sen. Homer E. Capehart (Rep., Ind.), chairman.

The commissioners agreed with the congressmen that a full-dress inquiry to clarify the status of pricing methods might be helpful, but denied that new legislation is needed. Senator Capehart has proposed such an inquiry.

The four commissioners, Chairman Robert E. Freer, W. A. Ayres, E. L. Davis and Garland S. Ferguson, declared that the legality of any system of freight absorption must be determined in each individual case. Court decisions to date, they added, make freight absorption illegal only if it is a part of a general price fixing conspiracy or constitutes unjust discrimination which injures competition.

Little Clarification—The commissioners contended there is no way of advising business men what pricing methods are legal. Each case, they said, must be examined separately to weigh the various factors that might enter into collusion, discrimination or unfair competition.

"We cannot tell business what to do," explained Chairman Freer. "All we can do is to determine illegality under the yardsticks set up by Congress and issue cease-and-desist orders."

Mr. Freer said that contrary to general impressions the Cement decision does not prohibit the use of the basing point system in itself, but only outlaws a basing point system when it results from concerted action, and consumers undergo injury as result of lessened competition. He expressed the opinion that there is nothing wrong in United States Steel Corp. subsidiaries using a basing point system with the absorption of freight except for the fact U. S. Steel has a basing point system in concert with the remainder of the industry.

To a question as to whether the Staley decision outlaws systematic absorption of freight to meet a competitor's prices, the unanimous answer was that it does have that effect.

Holds New Law Not Needed—Commissioner Ferguson in trying to explain why new legislation to clarify the situation is not necessary said everybody ought to know by this time what is legal and what is illegal.

Commissioner Davis opined that if business men sincerely try to follow the decisions they should have little trouble, but added that they would get into trouble if they seek loopholes which permit evasion of the various rulings.

The commissioners admitted that the Chicago Circuit Court went a step further than the Supreme Court when in the Rigid Steel Conduit Case it held that proof of the existence of a conspiracy is not necessary when the pattern is one that could result from conspiracy.

FTC Counsel Walter B. Wooden told the congressmen that the Cement decision has placed some producing and consuming locations at a disadvantage but argued that consumers generally will be benefited in the long run.

Senator Still Puzzled—Senator Capehart concluded the hearing by saying it was his impression that the commissioners had no suggestions as to how honest business men in many industries can obtain an answer as to whether the pricing policies they have been following in good faith for years are legal or illegal. Before deciding to undertake a major inquiry, the subcommittee will hear Commissioner Lowell B. Mason who has plans for a positive legislative program by which business men operating under the supervision of the FTC would enjoy antitrust law immunity as long as they followed the advice of the commission, with the approval of the Department of Justice.

Present, Past and Pending

■ DISPUTE CLOSES LUKENS OPEN HEARTHS

COATESVILLE, PA.—All open-hearth furnaces of Lukens Steel Co. were closed down last week in a labor-management dispute over working rules.

■ REFRIGERATION EQUIPMENT FIRM SOLD

NEW YORK—Noma Electric Corp. has acquired the assets of Stangard-Dickerson Corp., Newark, N. J., producer of refrigeration equipment.

■ K-F MAY SELL STEEL COMPANY STOCK

PORTSMOUTH, O.—Arrangements to buy the 200,000-share block of Portsmouth Steel Corp. stock held by Kaiser-Frazer Corp. have been made. A small group, not identified, will hold the stock for investment.

■ ELECTRICAL GOODS PLANT PURCHASED

CLEVELAND—Apex Electrical Mfg. Co. has purchased all capital stock of Lake State Products Inc., Jackson, Mich., manufacturer of electric dishwashers and portable clothes washers.

■ BIG PURCHASE OF ENAMEL MADE BY LUSTRON

COLUMBUS, O.—Lustron Corp., new manufacturer of steel houses, has ordered from Chicago Vitreous Enamel Product Co., Chicago, 10,578,000 lb of frit and clay, valued at $1,206,445.

■ U. S. TO SELL AMERICAN BOSCH STOCK

WASHINGTON—Office of the U. S. Attorney General plans to sell in late July the 77 per cent stock ownership it has held in American Bosch Corp. since 1942 under alien property laws.

■ GENERAL METALS BUILDS NEW FOUNDRY

OAKLAND, CALIF.—General Metals Corp. is erecting a million-dollar plant to produce malleable iron castings.

■ CARNEGIE ELECTS NEW VICE PRESIDENT

PITTSBURGH—J. Douglas Darby has been promoted from general manager of sales to vice president in charge of sales, Carnegie-Illinois Steel Corp., succeeding Thomas J. Hilliard, resigned.

Steel Purchasing Changes Seen

Buyers told at annual convention to expect many changes in conventional consumer-producer relationships. Warned to prepare for basing point problems

PURCHASING agents in New York last week were told to expect many changes in conventional consumer-producer relationships in steel and new and disturbing problems in the assembly of raw materials which will continue to add to the expense of producing steel.

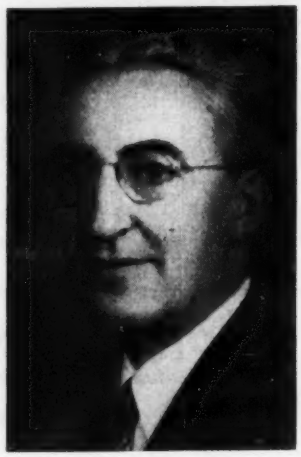
This warning was made by Hiland C. Batcheller, president, Allegheny Ludlum Steel Corp., Brackenridge, Pa., at the 33rd annual international convention of the National Association of Purchasing Agents at the Waldorf-Astoria, May 31-June 2 inclusive.

Referring to the recent Supreme Court decision in ordering the cement industry to "cease and desist" its practice of multiple basing point selling, he suggested that purchasing agents would be wise to prepare for some entirely new problems in the purchase of steel, and added his prediction that if f.o.b. mill pricing is extended to steel, the whole price structure will likely advance. He said that right now the Federal Trade Commission, which has long been pecking away at the multiple basing point system in an effort to force an f.o.b. mill system, "seems to have victory within its grasp."

Expects No Early Change—In response to a suggestion at the steel forum that the association go on record as opposed to the f.o.b. mill basing system for steel, F. G. Syburg, chairman of the association's committee on steel, and manager of purchasing, Chain Belt Co., Milwaukee, pointed out that it had been the organization's policy in the past to avoid controversial issues of that kind, to stay out of matters having political implications. He said that actually, in his opinion, the cases of cement and steel are not identical and added that consumers of steel are much more permanently located than those of cement. He believed that the steel industry, having faith in its present multiple basing point system, would continue to fight for it. In any event, he did not look for any early change in the present set-up.

As had been pointed out by other speakers at the convention, he said that some consumers would gain by a shift to an f.o.b. mill basing point while others would lose; but that he thought personally such a shift, as a long-range proposition, would be detrimental to by far the majority of steel consumers.

One purchasing agent suggested that it might be a good idea for those who believe that they might be adversely affected by a change to an f.o.b. mill basing point system to appeal, as individuals, to their congressmen for maintenance of the present system, carrying with their appeals supporting facts and information.



RALPH O. KEEFER
Newly elected president, National Association of Purchasing Agents

Sees Tight Metal Supply — Commenting upon copper and nonferrous metals, John A. Danaher, Washington, D. C., attorney, and former United States senator from Connecticut, summed up the supply and demand outlook for red metal by saying that "throughout the balance of 1948 and the foreseeable future thereafter, we will be faced with the annual necessity of bringing into this country in the neighborhood of 500,000 tons of foreign copper." Viewed from Washington, he said, "the copper situation is tight—and it still can be tighter."

He urged that Congress repeal the excess tax on copper rather than merely suspend its imposition. "There should be no barrier to the availability for American industrial use of an adequate supply of an essential raw material which cannot domestically be produced in quantities sufficient for needs. No expert in government or in industry expects that our annual domestic production of primary copper will greatly exceed 875,000 tons and that scrap will be available in amounts greater than 20,000 tons."

Attendance Heavy—Attended by more than 2300 purchasing agents, the convention had for its theme: "When Do We Go? . . . Where?" Business trends and price movements in general came in for considerable discussion, with attention being directed, in addition to steel and metals, to such other basic items as coal, fuel oil, chemical and allied products, textiles and so forth.

Ralph O. Keefer, general purchasing agent, Aluminum Co. of America, Pittsburgh, was elected president of the association, succeeding Garnet T. Dickson, manager of purchases and customs, Goodyear Tire & Rubber Co. of Canada Ltd., New Toronto.

The new executive committee includes, in addition to Mr. Keefer and Mr. Dickson, Nelson J. Gibbins, Motor Wheel Corp., Lansing, Mich.; Lyall C. Stilp, Kimberly-Clark Corp., Neenah, Wis.; George J. Cronin, the Commonwealth of Massachusetts, Boston; C. J. McLaren, Shell Oil Co. Inc., Tulsa, Okla.; and T. A. Corcoran, the *Courier-Journal* and the *Louisville Times*, Louisville, Ky.

Also included are E. Lee Clayton, the Philip Carey Mfg. Co., Lockland, Cincinnati; L. H. Cake, J. E. Haseltine & Co., Portland, Oreg.; J. S. Rutherford, American Magnesium Corp., Buffalo; and H. D. Caplan, Building Products Ltd., Montreal. Mr. Corcoran was named financial member of the executive committee.

The annual banquet was featured by the presentation of the J. Shipman gold medal to F. Albert Hayes, director of purchasing, Bigelow-Sanford Carpet Co., New York, and a talk by Dr. John L. Davis, Chicago.

Expects More Inflation — Martin L. Gainsbrugh, chief economist, National Industrial Conference Board, New York, saw further inflation ahead as a result of the proposed rearmament program. "Each dollar," he said, "spent for armament in the months ahead will push us steadily away from the possibility of absorbing the unparalleled inflation of World War II."

He explained that this revival of basic economic forces may not be visible for some time, but that with each passing month Rearmament II will become the growing determinant of how materials and labor shall be allocated.

"Initially this allocation," he asserted, "will come through market forces, bringing with it the cost-induced elements of inflation. Later as increasing billions of dollars are paid out to consumers for the pro-

duction of military goods for which consumers cannot bid, growing elements of demand-induced inflation will be added."

Sees Coal Expansion — During the coal forum, H. A. Glover, vice president, Island Creek Coal Sales Co., Huntington, W. Va., disclosed that within the next two or three years the coal industry needs to spend a minimum of $500 million or $600 million for new plants and equipment.

During the fuel oil forum, A. J. McIntosh, economist, Socony-Vacuum Oil Co. Inc., New York, declared that increased production of crude oil, natural gas liquids, and imports of crude will just about equal increased demand.

Mr. Batcheller, in his discussion of the steel situation, pointed out that the vast deposits of ore still remaining consist of relatively low grade, the processing of which has not yet been fully perfected. "When these processing problems are solved, we can face with almost certainty increased costs, which will almost certainly be reflected in the selling price of steel."

As domestic iron ore becomes increasingly costly, the search for foreign ores will become more intense. "In this hemisphere," he said, "engineers are already wrestling with the problems of utilizing the inaccessible Labrador deposits and the even more inaccessible deposits in the interior of Brazil."

Bleak Outlook — He said also it is becoming increasingly obvious that scrap may never again be plentiful. The war greatly accelerated the downward trend in supply, with a result that each ton of steel, as time goes on, will require an increasing percentage of pig iron—and thus ore—than was the practice in prewar days. All this, he said, makes the outlook for the small non-integrated mill a rather bleak one. Such mills have customarily drawn their semi-finished steel or pig iron from large integrated mills. They are being increasingly discouraged in this practice, he said, and the near future will magnify their problem.

He stated that from the economic viewpoint only there is every probability that steel mills will become progressively larger, more complex and more costly. Increased mechanization and the constant pressure to push labor productivity upward will demand larger productive units.

Commenting further, he said it already costs three or four times as much to construct a ton of ingot capacity as compared with prewar. "There is every indication that the

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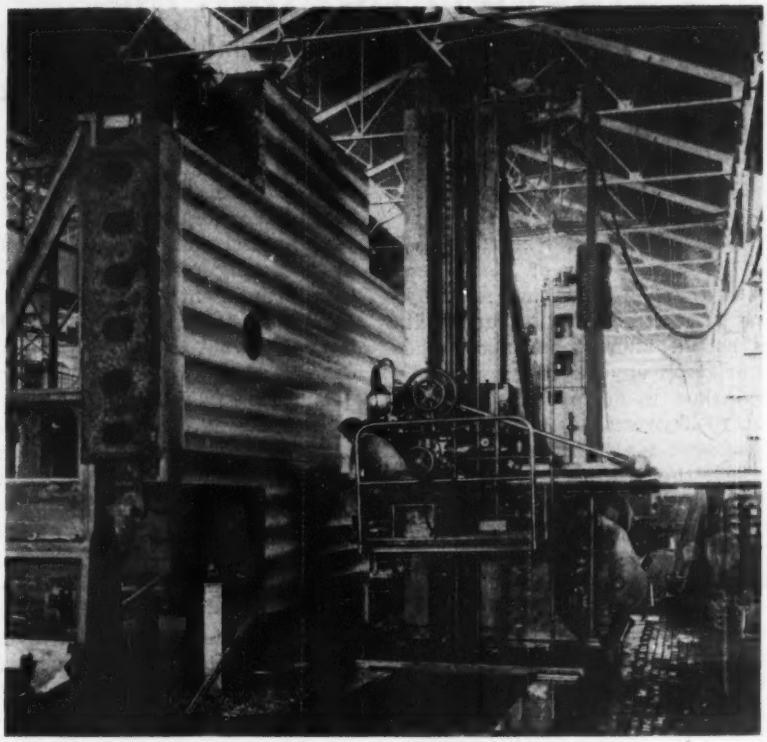


BASE FOR TESTING MACHINE: Steel casting to serve as base for a 5,000,000-pound universal testing machine is faced in the plant of Baldwin Locomotive works. Casting is 22 feet long, 12 feet wide and 3 feet thick. Machine will be installed at the Philadelphia Navy yard and will be used for testing tension, compression and flexure

ASME Hears 75 Papers

Milwaukee program covers wide range of subjects reflecting broadened horizons of mechanical engineering. Products exposition held in connection with meeting

MILWAUKEE

LEADING industrialists of Milwaukee and vicinity were prominent in activities of the semi-annual meeting of the American Society of Mechanical Engineers at Hotel Schroeder, May 30 through June 5.

Tied in with this national meeting, which drew attendance estimated at 2000, was an extensive exhibition of industrial products of Wisconsin, both the meeting and exhibition being featured as phases of the state's centennial observance.

Also keyed into the same program was an interesting series of plant visitations, including: Kearney & Trecker Corp., Nordberg Mfg. Co., Falk Corp., A. O. Smith Corp., Allis-Chalmers Mfg. Co., and the shops of the Milwaukee Road. These inspection trips did much to open the eyes of out-of-town visitors to the outstanding position which Milwaukee holds today as a heavy machinery building center.

Many Technical Sessions—Because of the widespread activities of the society, the meeting involved 28 technical sessions at which more than 75 papers were delivered. While there was satisfactory coverage of subjects having to do with steam power plants, it is a sign of changing times that major emphasis no longer was concentrated on that particular phase of engineering. Typical of the broadened horizons of mechanical engineering of 1948 were the heavily attended sessions dealing with nuclear energy, management, materials handling, gas turbines, rocket propulsion, hydraulic motors and controls, electronic computing machines, aircraft, education for industry, plastic forming of metal, design of springs, and production machine shop practice.

Among the many interesting papers on materials handling was one by Frank M. Blum, manager, Crane Sales Division, Harnischfeger Corp.,

(*Please turn to Page* 172)

Cure Steel Distribution Ills!

Senator Wherry demands steel committee come up with solution of domestic supply shortage problem. Says government controls may come if answer is not found

CONCLUDING what may prove to be a momentous round-table conference, Sen. Kenneth S. Wherry (Rep., Nebr.) told a group of steel men May 28 there is something radically wrong in steel distribution, and that they should know more about the answers than anybody else.

He asked them to come back in about 10 days with a report on how the evils of maldistribution can be cured—if they can be cured.

David F. Austin, vice president, United States Steel Corp. of Delaware, was designated as chairman of the steel group, which comprised largely the members of the Steel Products Advisory Committee of the Commerce Department's Office of Industry Co-operation.

The meeting was held at the instance of the Senate Small Business Committee of which Senator Wherry is chairman. The Small Business Committee, the senator told the steel men, has been studying the steel gray market, and the steel distribution picture in general, for a year and a half, and it still does not know what is to be done.

Voluntary or Mandatory Controls—"The issue boils down to this: Whether the steel industry wants to be free, or whether it wants a regimented economy. That is how serious the situation is. For if consumers are unable to get equitable distribution of steel by the voluntary method which Congress voted last December, it means government controls," the senator bluntly told the steel men. "I am turning to you in the industry in a final effort to find the remedy."

The problems, as Senator Wherry saw them, break down into the following categories:

1—New companies have no historical basis to get steel and hence are endangered with failure. He cited a farm implement manufacturing plant at Blair, Nebr., which employs 110 people of whom 80 per cent are veterans. "They can get steel only in the gray market and have to pay 11 cents a pound whereas the mill price is around 4 cents. This puts them at a competitive disadvantage under which they cannot exist."

Supplies Cut Off—2—Buyers have had their steel supply cut off wholly or in part at an increasing rate of late due to withdrawal of mills from certain territories they formerly served. "I do not say such withdrawals are unjustified; I do not expect a steel company to ruin itself by absorbing freight rate disadvantages consistently at a loss. But something has to be done for those buyers; I want to know what can be done."

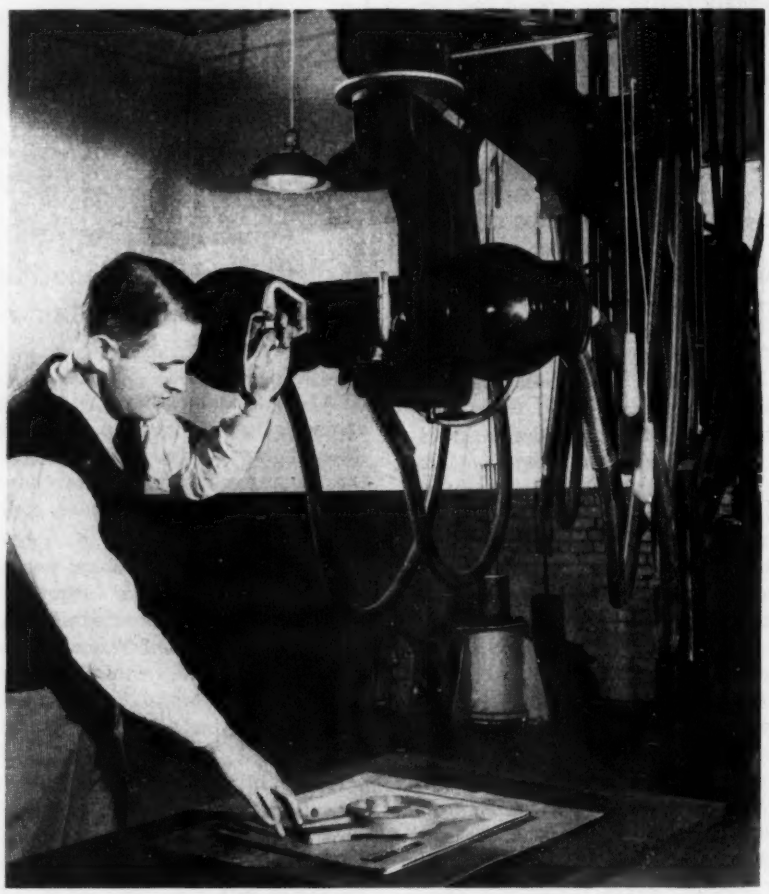
The senator said the evidence indicates the development of a "new" pattern of withdrawal by mills from certain former sales areas, and that this is hitting the midwestern, western and west coast states hard. In that whole area the problem of getting steel is much more difficult than in 1947, he said.

"The Senate Small Business Committee," he told the steel men, "knows of hundreds of consumers in that area, who, because regular sources have been cut off, have to buy one-third to 80 per cent of their steel in the gray market. Warehouses in that area in many cases are receiving only 30 to 40 per cent of the steel they received in 1947—and they have to hand this shortage on to their customers who are mostly small firms.

Situation Found Worse—"A survey of 2400 steel consumers in nine western states which recently was gotten under way has brought 901 responses to date. Of the 901 concerns, 67 per cent stated that their steel supply situation is worse than in 1947 and only 9 per cent said it was better," said Senator Wherry.

3—Under powers voted by Congress, priorities may be used to get steel either in rolled or fabricated form for shipment to nations participating in the Marshall Plan, whereas there is no priority power to take care of domestic needs.

4—The voluntary allocations agreements program is going "much too slowly" and is not nearly as broad as Senator Wherry expected it to be when he voted for Public Law 395. Five full months after enactment of



X-RAY IMPROVES CASTING TECHNIQUE: Radiographs of a wide variety of castings provide nondestructive test methods to help improve and speed up development of new foundry techniques at the Westinghouse Foundry & Copper Mill, Linhart, Pa. Photo shows preparations to x-ray a casting with a new 250,000 volt jib crane x-ray machine

the law and all we have had, with some minor exceptions, is preparatory and exploratory conferences. One explanation, he felt, is that industrialists have not taken wholehearted advantage of the law to alleviate distribution problems.

Hardship Cases Covered—Specifically, Senator Wherry voiced the belief that Public Law 395 authorizes such co-operative action as is necessary to take care of hardship cases among steel consumers and he said he was looking to the steel industry to devise ways and means.

The steel men said they are not consulted as to establishment of tonnages to be allocated for particular programs.

Mr. Austin told the senator that, on the basis of an estimate he had made purely for his own purposes, and on the basis of data available at the moment, steel that will be called for under priority or allocations programs will come to about 17 million tons during the 12-month period of July 1, 1948-June 30, 1949.

The amount of steel flowing into the above purposes, he said, ranges between 13 million and 14 million tons. Mr. Austin estimated 1948 finished rolled steel output would be 64 million to 65 million tons.

Product Allocations Revealed

PRODUCT ALLOCATIONS under proposed voluntary agreements for providing steel for atomic energy projects and for warm air heating equipment for residential housing have been revealed.

The 161,700 tons for atomic energy projects would consist of the following tonnages: Plates, 66,700; steel pipe, 35,600; structural shapes, 22,900; reinforcing bars, 22,700; hot and cold-rolled sheets, 6300; seamless tubing, 3400; rails, 3200; and galvanized sheets, 900.

The atomic energy allotments would go to eight projects and would be provided by 29 participating companies, with U. S. Steel Corp. counted as one company.

Heating Industry Tonnage — The 212,000 tons for the warm air heating industry would consist entirely of flat-rolled products and would be allotted as follows: Cold-rolled sheet and strip, 88,300; galvanized and coated sheets, 76,700; and hot-rolled sheet and strip, 47,000. The tonnages would be directed into the following products: Warm air furnaces, including jackets and casings, 125,000; furnace pipe fittings and duct work, 61,000; registers and grilles, 17,000; and furnace blowers, 9000. Tentatively 23 steel companies are listed to fill these requirements.

Public hearing on the proposed warm air heating equipment allotments is scheduled for 10 a.m., June 8, in the Department of Commerce auditorium, Washington.

Both the atomic energy program and the warm air heating equipment agreement would be in effect the eight months beginning July 1, 1948, and ending Feb. 28, 1949.

Impact To Be Felt—Steel producers say that while the atomic energy allotments are smaller than those for the warm air heating industry, the former likely will be felt to a greater extent inasmuch as they are entirely new requirements. On the other hand, the warm air heating allotments, it is said, include a substantial portion of the tonnage that would go to the warm air heating industry even though a voluntary agreement program were not in operation. The Warm Air Heating Advisory Committee has stated that estimated requirements to meet the needs of the 1948 housing program are as great as last year's total production of approximately 877,000 warm air furnace units and the necessary related items to permit heating installations.

In connection with the housing program a public hearing on a proposed voluntary agreement to provide pig iron for cast iron products is to be held at 10 a.m., June 11, in the Department of Commerce auditorium, Washington. Pig iron tonnages that would be made available under the agreement would be sufficient to manufacture products for (1) construction of new housing at the rate of one million units during 1948 and at the same annual rate during the first two months of 1949, and for (2) essential maintenance and repairs of residential housing units.

Type of Products—Types of cast iron housing products included in the agreement are pressure pipe and fittings, soil pipe and fittings, radiation, boilers, castings for warm air furnaces, plumbing drainage products, castings for low water cut-offs and boiler feeders, castings for circulating pumps and built-in water heaters, relief and producing valves, gray and malleable iron screwed fittings, recess drains and iron body valves.

A ruling whether the European Recovery Program and the national defense program may share in the voluntary allocation of steel is being sought from the attorney general by the Department of Commerce. The request followed a statement by Glenn H. Craig, acting industry director of the Economic Co-operation Administration, that unless foreign aid obtains preferred status like the domestic freight car industry ECA would be unable to get effective orders placed for foreign shipment of steel products.

OIC Moving Ahead—The Office of Industry Co-operation reports it is moving ahead vigorously to promote full production of scarce goods and materials basically affecting industrial output or the cost of living.

The OIC staff through May 17 had held 28 meetings with businessmen to discuss industry participation in the Voluntary Industry Agreements Program authorized by Public Law 395 passed by the Eightieth Congress. As a result of these meetings, the Secretary of Commerce up to May 10 had appointed members to 16 industry advisory committees, comprising representatives of large, medium, and small businesses in each industry, to participate in or consider participation in the voluntary agreements program.

Meetings . .

June 7-9, American Coke & Coal Chemicals Institute: Annual meeting at the Greenbrier, White Sulphur Springs, W. Va.

June 7-11, Pittsburgh International Conference on Surface Reactions: Conference will be held at the Mellon Institute, Pittsburgh. Conference secretary is Richard Rimbach. 1117 Wolfendale St., Pittsburgh.

June 10, Pressed Metal Institute, Chicago-Milwaukee District: Second fall-winter-spring meeting at Milwaukee Athletic Club, Milwaukee. National institute president is Tom J. Smith Jr., 629 Union Commerce Bldg., Cleveland.

June 11-12, American Society for Metals: Sixth biennial Pennsylvania interchapter meeting of groups located wholly or partly in the state, State College, Pa.

June 15, Chamber of Commerce of the United States: Economic institute on America and the International Trade Organization, Mayflower Hotel, Washington.

June 16-18, Electric Metal Makers Guild: 16th annual meeting, Bethlehem, Pa. Secretary-treasurer of the organization is D. L. Clark, 39 Grasmere Rd., Lockport, N. Y.

June 18, American Foundrymen's Association: Annual meeting of association's technical correlation committee, LaSalle Hotel, Chicago. Association headquarters are at 222 W. Adams St., Chicago.

June 21-25, American Society for Testing Materials: Annual meeting and exhibit of testing apparatus and related equipment, Book-Cadillac Hotel, Detroit. Society headquarters are located at 1916 Race St., Philadelphia.

June 21-25, American Institute of Electrical Engineers: Summer general meeting, Mexico City, Mexico. Institute secretary is H. H. Henline, 33 W. 39th St., New York.

June 28-July 1, American Electroplaters' Society: Annual convention and industrial finishing exposition, Ambassador Hotel, Atlantic City, N. J. Society headquarters are at 473 York Rd., Jenkintown, Pa.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Another set of government committees in making. Industrial executives may be asked to serve on industry advisory groups to National Security Resources Board

INDUSTRIAL executives may be asked shortly to begin serving on still another set of government industry advisory committees. The National Security Resources Board has such a plan in mind. In fact, it already has appointed its first advisory committee —a committee of men qualified to advise the board as to the control laws which it proposes to ask the President to demand of Congress.

This committee is to help work up the standby laws—to be made operative in event of war or an equivalent emergency — providing draft-labor, stockpiling, priority, rationing and other controls.

Other committees will be appointed later. They will result from needs revealed by informal discussions which Board Chairman Arthur M. Hill has been holding with business men and industrialists over the last few months. In this part of his job he is assisted chiefly by Bernard M. Baruch and Ferdinand Eberstadt.

The NSRB committees in no way will duplicate those of the Munitions Board as far as subject matter of discussions is concerned. Whereas the Munitions Board confers with its industry advisory committees on matters having to do with purely military preparation, the NSRB conferences will cover co-ordination of military and civilian requirements.

Some of Mr. Hill's informal conferences of late have had to do with the United States position in iron ore, ferroalloy minerals and other raw materials with a view to advancing the stockpiling policy.

One interesting fact about stockpiling, a restricted subject, was revealed to the Subcommittee on Mines & Mining of the House Public Lands Committee when Major General P. W. Timberlake of the Munitions Board appeared before it recently. He told the committee that the stockpiling objective, dollarwise, is to accumulate metals and minerals worth $2,686,449,000 and other materials worth $467,663,000. The program was mapped out on the assumption that the next war—if there is one—will take us no longer than five years to win.

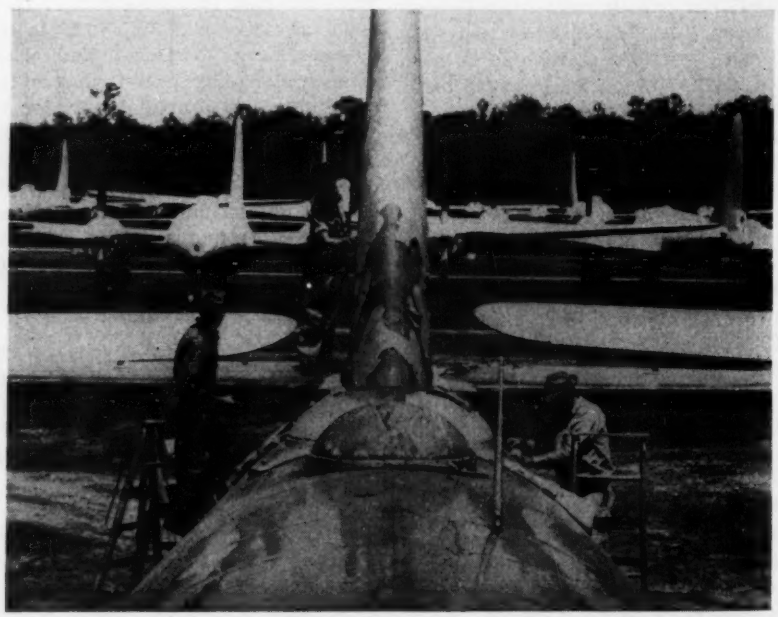
Not Whistling in Dark

Walter S. Tower, in his presidential address to the American Iron & Steel Institute on May 27, was not entirely whistling in the dark when he spoke of possible legislation by Congress to rescue American business from costly dislocations that threaten in the wake of the Supreme Court's cement and glucose basing point decisions. In Washington, chances for alleviating and clarifying legislation in regard to pricing methods are considered good.

That Congress is willing to help business by authorizing antitrust law immunity under certain specified conditions was again proven when the Senate on May 28 completed action on and sent to the White House for the President's attention the bill authorizing the railroads to hold rate-making conferences—provided that these conferences are conducted under the supervision of the Interstate Commerce Commission. This bill went through Congress in the face of undying objections by the administration, and particularly the Justice Department.

In the House the O'Hara bill is the leading measure aimed at giving business relief from arbitrary bureaucratic control. This is the bill which would strip the Federal Trade Commission of its judicial powers and would confine it to bringing action in the federal courts on charges of illegal pricing methods, of discrimination, etc. This bill probably will not be ready for this session, but it should have action from the next Congress. The House Committee on Interstate & Foreign Commerce completed hearings on the bill May 10. The transcript now is in the hands of the Government Printing Office and after the printed record is available the committee will meet in executive session and decide what to do with the bill from there on.

But the best chance for relief seems to be inherent in a resolution introduced by Senator Capehart, calling on the Senate Interstate & Foreign Commerce Committee to conduct a full-dress inquiry into the effects of the cement and glucose decisions "upon large and small business" and submit a report next March in time for action by the next Congress. The resolution is in the hands of a subcommittee comprised of Senators Capehart, Brewster, Hawkes, John-



DECOCOON SUPERFORTS: Workmen strip the plastic skin from a cocooned B-29 superfortress at Robins Air Base in Georgia to test the efficiency of the coating, applied in 1946. Inspectors report no corrosion of a serious nature, although further checks will be necessary to test the accuracy of flight instruments thus preserved. NEA photo

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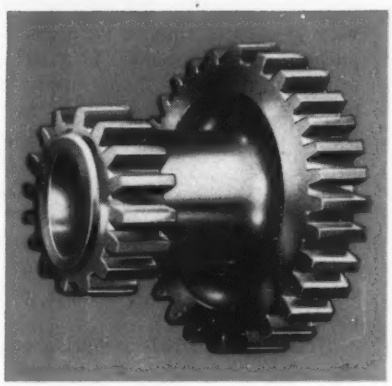

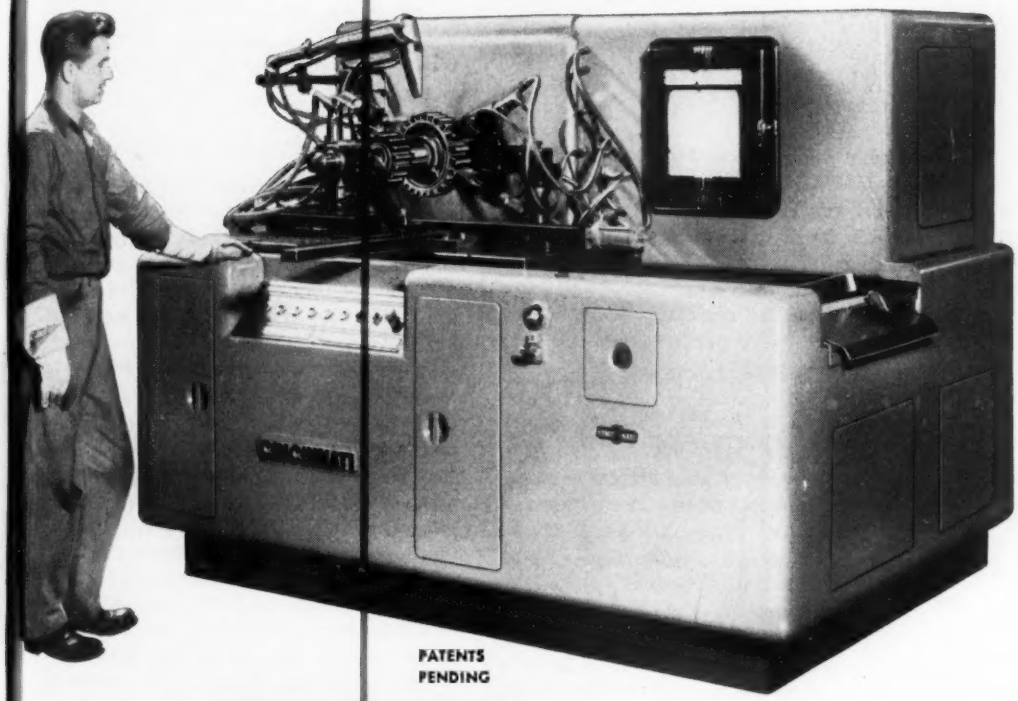

PATENTS PENDING

Length:	12"
Pitch diam.:	8.333 and 9.333
Diametral pitch:	6
Material:	Cast steel alloy (.40-.50 C; .90-1.10 Mn; .55-.65 C
Surface hardness:	up to 60 Rockwell "C"

. . . Flamatic hardened at substantial savings over previous methods. Unit Crane & Shovel Corp. uses the Cincinnati Flamatic for surface hardening an unusually wide range of parts, and gets exceptional results. This 60-pound cluster gear, for instance, requires only a 6-minute cycle to harden the large O. D., only 4 minutes for the small O. D. Except for loading, operation is automatic and desired "physicals" are obtained uniformly, part after part.

High temperature flames heat the surface rapidly to within plus or minus 5°F of the desired preset temperature, at which instant the electronic "Eye," through relays, causes the part to be deposited in the oil quench.

Core properties: unaffected. Distortion: negligible. Work size capacity: gears, pinions, cams, etc., up to 12" diameter depending on width, shafts up to 18" long depending on diameter.

Unit Crane & Shovel Corp., for whom this machine was equipped with special (yet low cost) fixtures, writes: "Flamatic has been successful beyond our expectations . . . The reduction in our cost for this operation has been such that it has proven a very profitable piece of equipment." **Write today for complete 20-page catalog.**

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son of Colorado and McMahon—a very good selection of senators sympathetic to business. The subcommittee decided to hold preliminary hearings starting June 2 and lay the groundwork for a recommendation to the full committee for a full-fledged investigation to be conducted this summer and fall. At the contemplated full-scale hearings business men would get an opportunity to voice their complaints and recommendations.

Unless New Dealers should control the 81st Congress, the outlook for remedial legislation can be considered good.

Steel Industry Attacked

While it did not get much newspaper space, the recent speech of Henry Wallace at York, Pa., is of interest to steel men because of his blistering attack on this industry.

"The big steel monopoly," he declared, "is in the forefront of the current attempt of big business to hamstring world recovery in order to increase already fantastic profits . . . Steel is the key product of our entire economy. It is a monopoly of large firms. . . . (which) decides how much steel we should produce, how many houses can be built, how many automobiles can be made, and how many machines can be installed in factories here at home; it also determines much of our foreign policy and the future welfare of peoples the world over.

"We can't afford to let the steel trust control the people. We must control the steel trust."

British Tin Tax Scored

John Croston, a metal expert of the National Security Resources Board is disturbed over British policy with respect to export of Malayan tin. Mr. Croston holds Britain is using an export tax on Malayan tin to "hamstring" operation of the tin smelter at Texas City, Tex., and so he told a Senate Armed Services Subcommittee a week ago.

He maintains that the export tax is so prohibitive as to completely bar this country from obtaining the high grade Malayan ore, and he said Britain will not remove the tax unless this country quits subsidizing the Texas City operation. Such, according to Mr. Croston, would result in abandonment of the plant, which is exactly what the British would like to see happen.

Continued government operation of the Texas City smelter beyond June 30, when Reconstruction Finance Corp. authority to operate it expires, is under consideration by the Senate committee.

Shipping Held Inadequate

American shipping now is dangerously inadequate unless we choose to fight the next war on our own soil, according to Adm. Louis E. Denfield, chief of naval operations. In a speech before the Propeller Club he revealed that the Merchant Marine has shrunk until we now have less than half the number of transports and tankers that would be required to wage a military campaign the size of the last war. Of the 6000 merchant ships which had been amassed by the end of the war, less than 2000 are active today, though there are 1400 in reserve.

Declaring that not only is the nation's merchant marine too small but it is also obsolete, Admiral Denfield warned that our steel mills would close down without imports of manganese and that "railroads, our factories, our airplanes absolutely depend upon the merchant ships which transport every ounce of the tin used in this country."

Finnish Exports Approved

Department of Commerce has approved export licenses for shipment to Finland of $3,890,000 worth of industrial materials. Additional license approvals will be announced soon. Materials approved for shipment include $175,000 worth of machine tools; 1085 tons of steel plates, bars and other miscellaneous steel products; $1,085,534 worth of coal pulverizers and boiler parts for use in new hydro and steam electric generating stations; 5400 bales of raw cotton; 6 large chlorine storage tanks; 480 tons of steel tubes and pipes; $194,000 worth of fire brick and refractories; 5 card-punching, assorting and tabulating machines; $596,000 worth of miscellaneous electrical and industrial equipment; and $490,000 worth of power generating equipment.

Virden To Stay in Post

Following a flood of letters and editorials condemning the circumstances under which John C. Virden, Cleveland industrialist, felt constrained to resign his post in the Commerce Department as director of the Office of Industry Co-operation, Mr. Virden, assured by President Truman and Commerce Secretary Sawyer of their faith in his efficiency and loyalty, has reconsidered and decided to remain at his post in the department.

His resignation had followed a demand for such action by Rep. Fred L. Crawford of Michigan who had made known that Mr. Virden's 22-year old daughter, Euphemia, is employed as a teletype operator by Tass, the Soviet news agency.

Ban Trade Association Men

Trade association executives continue banned from participation in industry advisory committee meetings with the Office of Industry Co-operation of the Commerce Department, it became known last week. Although the Justice Department has issued no written objection to such participation, it has laid down this policy orally in meetings with interested government departments and agencies.

1948 Expansion To Be High

American business, exclusive of agriculture, expects to spend about $18.7 billion during 1948 for construction of new plants and purchase of new equipment, according to a quarterly survey made public jointly by the Securities & Exchange Commission and the Department of Commerce.

Actual expenditures during 1947 amounted to $16.2 billion, the survey shows. Expenditures for the first quarter of 1948 are estimated at $4.5 billion, and it is anticipated they will increase during the last three quarters. The 1948 total as estimated will be 15 per cent higher than actual expenditures in 1947 and more than twice the amount expended in 1929 or 1941, the two prewar high years. Adjusting for price increases, expenditures in 1948 would still be higher than in 1929, 1941 or 1947.

Planned expenditures by manufacturing companies for 1948 are estimated at nearly $7.8 billion. Manufacturing as a whole anticipates little change from 1947 in the volume of its expansion. Railroads, on the other hand, plan very substantial increases.

Adds to Iron Ore Reserves

Approximately 19 million tons of magnetic iron ore assaying 26 per cent iron were added to the nation's mineral reserves by research by the Bureau of Mines during 1947, according to the recent annual report of the Department of the Interior.

Bureau research also accounted for the discovery of other new reserves, including 1,200,000 tons of ore containing 2.3 per cent copper; 363,000 tons of lead-zinc ore containing 2.5 per cent lead and 4.7 per cent zinc; 21 million tons of black sand deposits composed of 54 per cent titanium, 15 per cent zircon, 14 per cent staurolite and other minerals.

No Abatement In U. K. Steel Seizure Talk

BIRMINGHAM, ENG.

IN SPITE OF production records established month after month by the British iron and steel industry, agitation for nationalization goes on, several prominent members of the government having reaffirmed their intention of accomplishing the act during the life of the present government.

It is difficult to see how production could be increased further under government direction, particularly in view of the difficulties which have been experienced by the government in operating the coal mines.

Steel production, regardless of ownership, can be maintained only if sufficient supplies of coke, pig iron and scrap are assured. At the present time the country's high rate of steel production reflects the success of the intensified scrap drive, and collections have been large enough to check the fall in stocks of scrap and of pig iron.

April steel production was at the record annual rate of 15,283,000 tons, compared with 15,117,000 in March and 12,294,000 a year ago when output was affected by the fuel crisis. Pig iron production is also improving, being at the annual rate of 9,433,000 tons in April, compared with 9,303,000 tons in March and 7,238,000 tons a year ago. For the first four months this year, steel output has averaged 15,016,000 tons on an annual basis.

New Facilities Approved—The government's official list of major programs to expand and modernize crude steel and foundry pig iron producing facilities was recently announced in the House of Commons. Approval for these expansions has been granted. They are:

Installation of ore unloading plant, additions to coke ovens, ore preparation plant and services, rebuilding of two blast furnaces and new melting shop at Steel Co. of Wales Ltd., Margam;

New coke oven battery, additional open-hearth steelmaking furnace at Richard Thomas & Baldwins, Ebbw Vale;

Ore unloading, crushing, screening and sintering plant on Tees-side, two new blast furnaces at Cleveland to replace obsolete units, new steelmaking plant at Lackenby by Dorman Long & Co. Ltd.;

New coke oven battery, two new blast furnaces to replace obsolete units at Consett Iron Co., Consett;

Replacement of blast furnace by one modern unit, reorganization of steelmaking plant at Skinningrove Iron Co., Saltburn;

Additional coke ovens and provision of third blast furnace at Clyde ironworks, replacement of steelmaking furnaces at Clydebridge, conversion of furnaces to oil burning at Dalzell, all units of Colvilles;

Reconstruction of melting shop of Stewarts & Lloyds, Clydesdale;

Replacement of coke oven battery by United Steel Cos., Treeton;

Installation of new open-hearth steelmaking furnace at John Baker & Bessemer, Rotherham;

Mechanization of equipment for charging blast furnaces by Park Gate Iron & Steel Co. Ltd., Rotherham;

Erection of coke ovens and blast furnace, new melting shop at John Summers & Sons, Shotton;

New melting shop at Round Oak Steelworks, Brierley Hill;

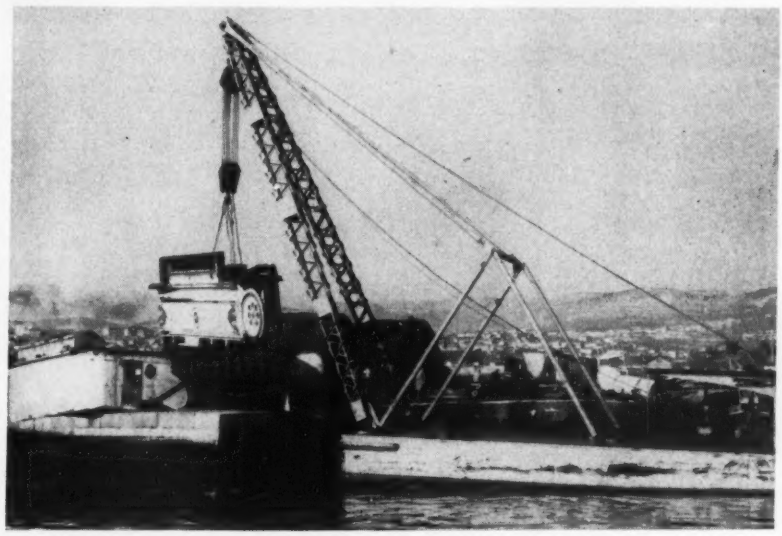
Rebuilding of two blast furnaces, installation of ore crushing, screening and sintering plant and gas cleaning plant by Sheepbridge Coal & Iron Co., Chesterfield;

Ore preparation plants, increase of coke oven capacity, new open-hearth melting shop by Stewarts & Lloyds at Corby;

New coke oven battery, erection of two new blast furnaces to replace obsolete units, new melting shop by United Steel Cos. at Scunthorpe;

New coke oven battery, provision of ore crushing plant, modernization of existing blast furnace and erection of new blast furnace to replace obsolete unit, rebuilding and enlarging steelmaking furnace at Scunthorpe works, John Lysaght;

New blast furnace to replace two obsolete units, ore handling plant and pig casting machines, other improvements at Richard Thomas & Baldwins, Scunthorpe.



SHIP SALVAGE: Ten Italian ships which were either scuttled or bombed and sunk in the Bay of Muggia are being salvaged at Trieste. Largest of the ships is the 20,000-ton liner Giulio Cesare, built in 1941, scuttled by the Italians in 1943, raised by the Germans in 1944 only to be bombed and burned by the Allies in the same year. Photo shows section of the dining salon being lowered to the dock. Salvage men hope to save the hulls for use in new ships, but other parts will be converted into scrap to be remelted into new ship steel. NEA photo

Better Materials Supply Boosts French Output

PARIS, FRANCE

Substantial increase in iron and steel output is noticeable since supply of coal and coke has improved, and additional blast furnaces have been blown in.

Output of steel ingots and castings in March was 626,000 metric tons, compared with 564,000 tons in February and a monthly average of 662,000 tons in 1939. Pig iron production was 523,000 tons in March, compared with 480,000 tons in February and a monthly average of 615,000 tons in 1939. Rolled products output in March was 446,000 tons, against 407,000 tons in February and a 408,000-ton average in 1939.

First shipment of 2500 tons of equipment for the continuous strip mill to be erected at Denain and Acieries du Nord-Est has arrived in a French port.

This is a section of the automatic screw machine department of New Departure's new automotive bearing plant at Sandusky, O.

New Streamlined Bearing Plant

LATE in 1945, the New Departure Division, General Motors Corp., broke ground for its new ultra-modern streamlined ball bearing plant in Sandusky, O., which is about midway between Cleveland and Toledo. By November, 1946, initial production was under way and the first case of bearings had been shipped.

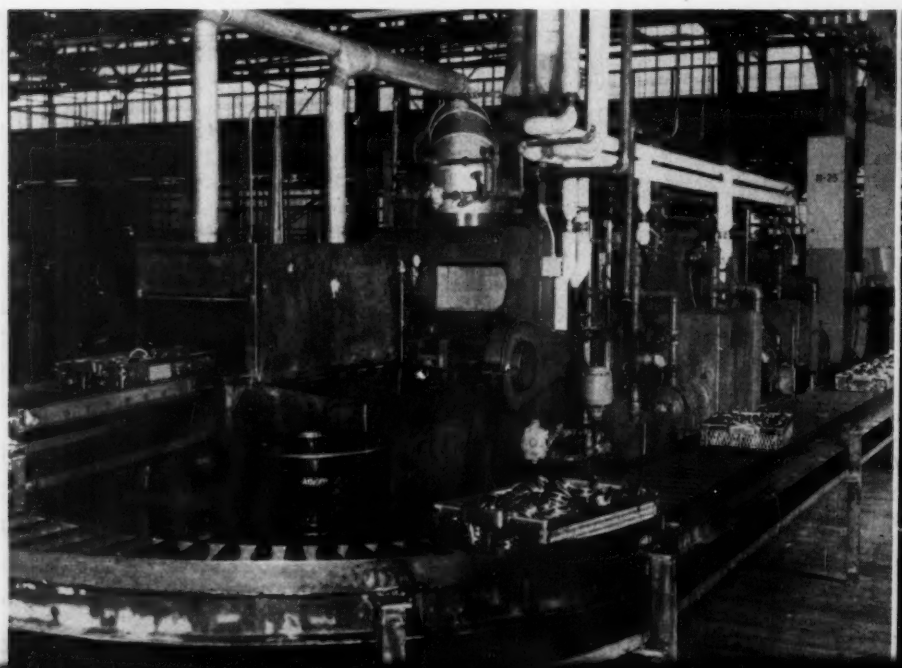
Production now is at the rate of 1,300,000 units monthly and will average between 1,750,000 and 2,000,000 a month some time during the next year when the plant gets into full production.

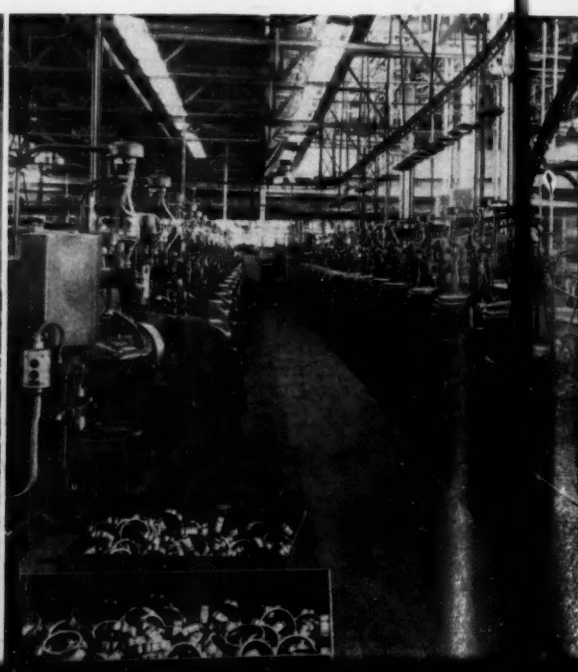
The 750,000 sq ft plant now is operating two full shifts with about 20 per cent of its 1600 workers on third shift bottleneck operations, made necessary by shortages of certain types of equipment. Included are machines for grinding the inside diameters of bearing races.

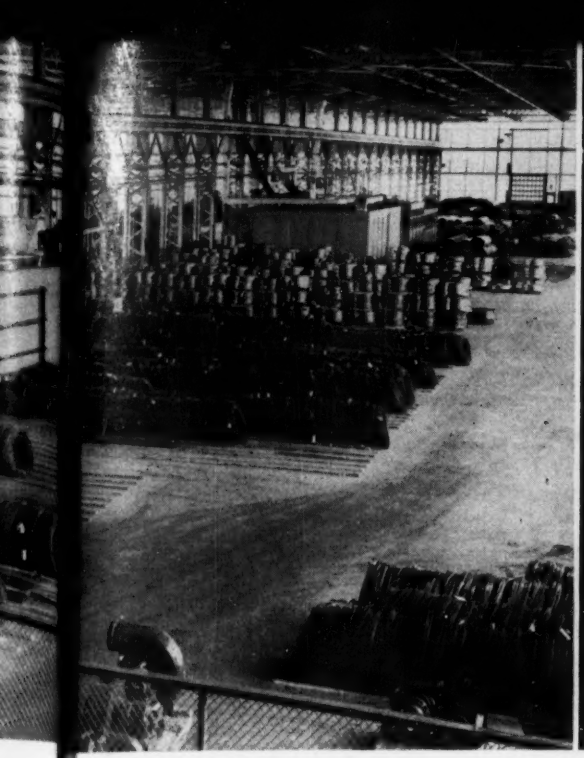
While New Departure makes bearings at Bristol and Meriden, Conn., for various industries, the Sandusky plant specializes in automotive types ranging in size from 2¼ to 3½ in. OD, including those for front and rear wheels, transmissions and fan and water pump units. One self-sealed type for rear wheels requires no lubrication for the life of the car.

New Departure uses washers to clean parts between operations to save time and reduce rejections. This automatic machine uses alkaline cleaners

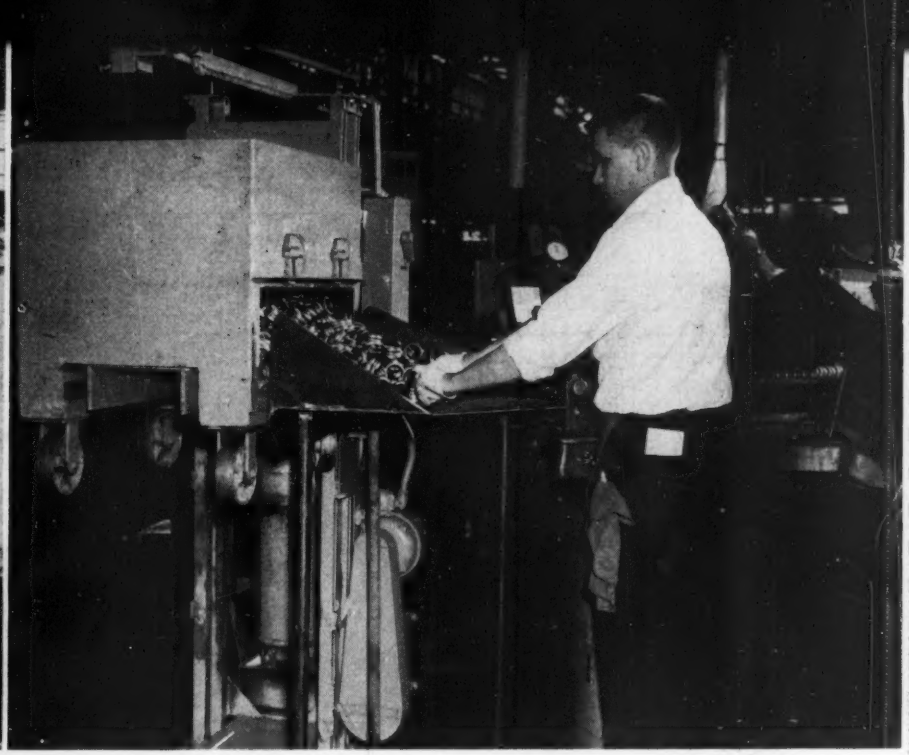
Here is shown a battery of oscillating ball race grinders. Note overhead conveyor for moving small parts from one operation to another







About 60 tons of steel move daily into production from this storage area, served by a bridge crane and the conveyor at the lower left



Outside diameters of bearing cones are ground on centerless grinders. Note how pneumatic hoist is used to raise parts up to work level

The plant uses about 60 tons of steel a day, which is delivered to the storage area (above, center) by rail or truck and includes bar stock for bearing races, cold-rolled strip for separators and wire for balls. Races for front wheel bearings are hot-forged and subsequently machined, heat treated and ground to exact size. Races for rear wheel and transmission bearings are machined from bar stock and tubing.

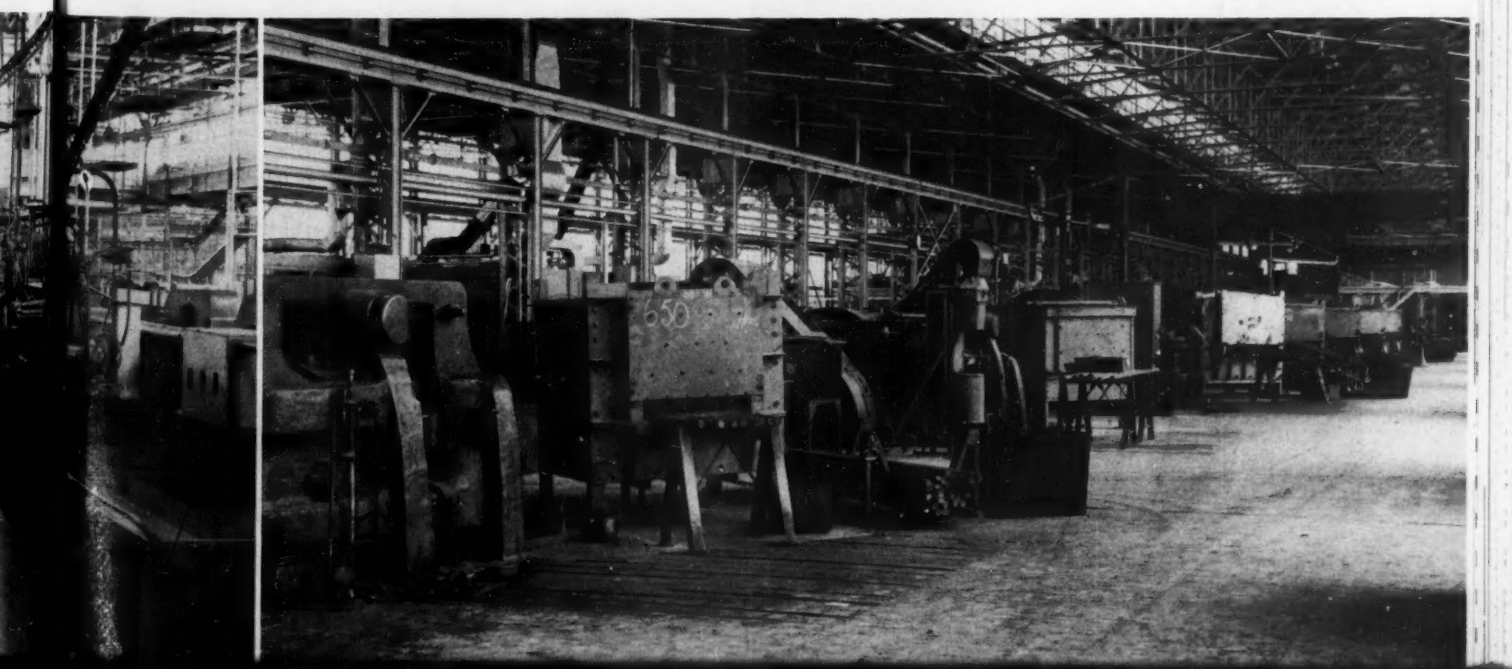
Balls are cold-formed from wire, ground and polished to exact size. Separators for holding the balls in place are formed on stamping presses. Production has not been slowed down much by lack of steel, a large part of which is of alloy grade, mostly SAE 52100.

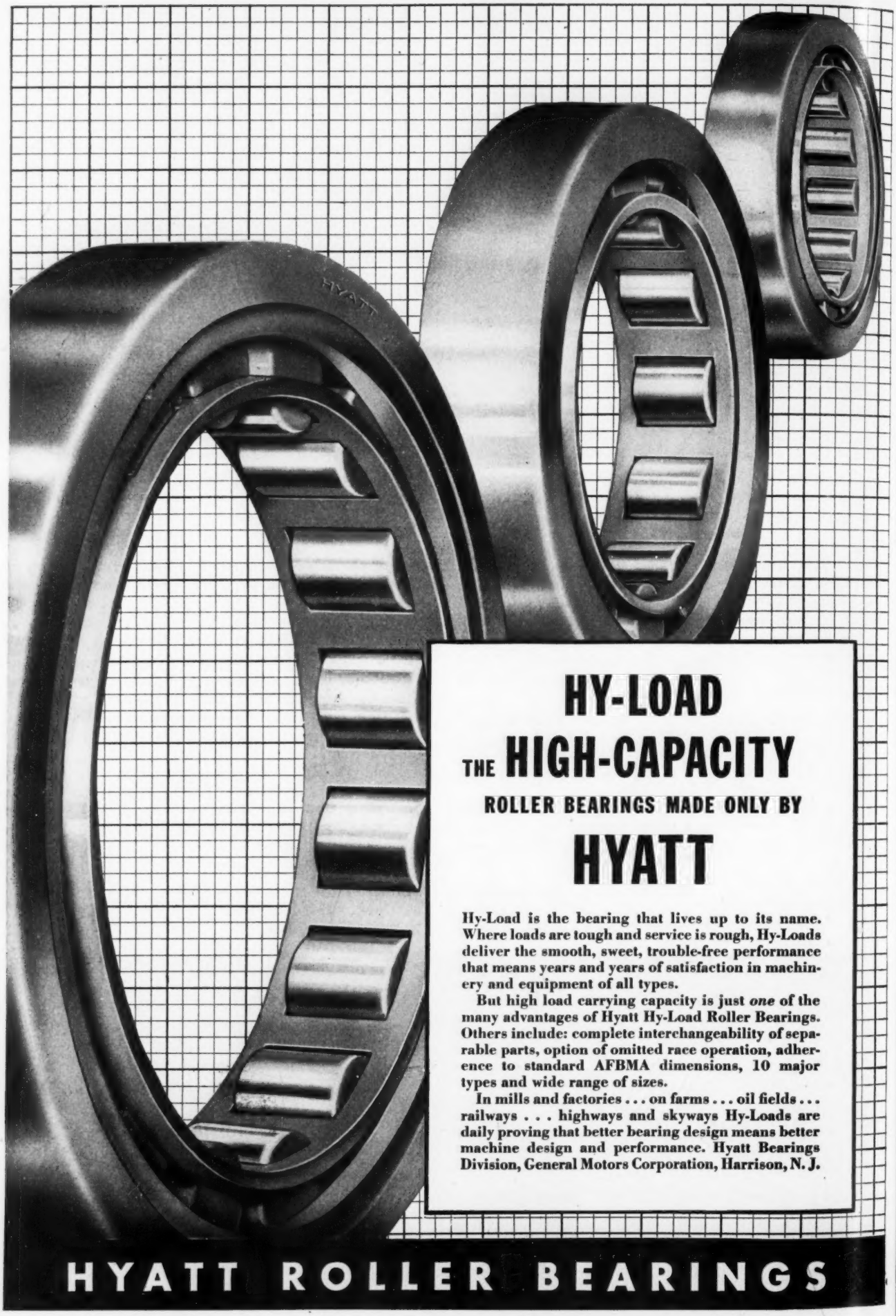
Materials handling has been worked out to reduce physical effort on the part of the workers to a minimum. Practically every type of handling equipment is used, including power-driven and gravity roller conveyors, chain link and belt type conveyors, overhead monorail conveyors, floor trucks, caster buckets, elevators for moving parts and scrap to and from machines, plus adaptations which have been worked out by New Departure "idea" men.

Production schedules and handling are so integrated that there appears to be no choke points. Even the cutting oil from grinding machines is pumped to a central plant for cleaning and reconditioning and then pumped back to the machines.

That planning took into active consideration the comfort of the employees is demonstrated by the modern cafeteria, medical section, locker room and wash room layouts. Congestion between shifts is eliminated by use of overhead walkways.

Races for front wheel bearings are forged from bar stock in horizontal forging machines in this sequence: (1) Upset, (2) pierce, (3) cut off. Each machine is served by its own heating furnace





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In mills and factories . . . on farms . . . oil fields . . . railways . . . highways and skyways Hy-Loads are daily proving that better bearing design means better machine design and performance. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.

HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

General Motors wage settlement, gearing hourly rates to cost-of-living index, unlikely to be pattern in other industries. Chrysler grants flat 13-cent increase

DETROIT

A SECOND look at the General Motors formula covering the 1948 wage increase discloses a number of disturbing factors, most of which probably occurred to GM negotiators and economists before their proposal was made but had to be discounted in view of the necessity for keeping production moving. For one thing, the cost-of-living increase has been met and passed in wage rates of most major industries other than automobiles, and the reason it had not been passed in automobiles is that rates in that industry in 1940 were well ahead of other basic industries. Hence it is likely the GM settlement will not prove the "pattern" it was thought originally, since in many industries a cost-of-living adjustment would mean a decrease in present rates; in steel, for example, wages are estimated to have advanced 80 per cent from 1940, against a 69 per cent rise in the cost-of-living index.

Further, there is a danger in "freezing" wages to a cost-of-living index, since it might be just a matter of wages chasing the index up to dizzy heights.

On top of that is the additional inflationary effect of the many "fringe" wage payments made over and above basic hourly rates. These range all the way from 10 cents to as much as 35 cents an hour in some plants.

Chrysler Corp. apparently determined to keep away from any index factors and, following the GM announcement, offered a 13-cent hourly boost which was immediately snapped up by the UAW-CIO. This could seemingly become more nearly the industry pattern, although the figure is regarded as decidedly on the generous side. It is something under 10 per cent of average hourly rates.

Insist on Equalization—Ford announced wage discussions would be opened June 14, with no indication of any changed position from earlier proposals that wage equalization with competitors be made a basis for bargaining. Union spokesmen at the Rouge plant caustically remarked, "Someone in the inner circle of Ford this week is getting hell for the coup d'etat scored by General Motors over the 'Flivver Prince' when GM copped the prize publicity scoop of the year by announcing a 'human engineering' labor-management contract and a cost-of-living wage increase." And further in the same vein—"The standing joke in the auto industry is that Ford officials, overloaded with former GM executives, are still loyal to their former bosses at Wall Street and that they couldn't have done a better job for GM by their inane wage cutting proposals."

This is typical UAW poison-pen stuff, calculated to drum up the spite of the "brothers" in the ranks. When the chips are down, the union probably will be glad to settle for a wage rate competitive with Chrysler and GM.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1948	1947
January	422,324	366,205
February	399,460	393,636
March	519,126	443,588
April	461,348	445,137
May	351,295*	404,191
June		421,466
July		400,944
August		364,478
September		444,501
October		461,536
November		417,493
December		492,109
12 mos.		5,055,284

* Preliminary.

Estimates for week ended:

	1948	1947
May 15	83,275	83,201
May 22	91,138	96,651
May 29	92,105	79,315
June 5	65,000	98,499

Estimates by Ward's Automotive Reports

Adjustments for salaried working forces have been announced by Chrysler as the equivalent of 9 per cent, with $20 per month minimum. General Motors also has taken similar action, although no public announcement was made. Increases for GM salaried people will be the equivalent of the cost-of-living adjustment awarded hourly-rated personnel except that the formula for calculating changes is a little more complicated. GM executives in the so-called "bonus" group will receive no salary boosts.

What About Prices?—So the question now becomes—with a 7 per cent increase in labor cost, what about prices? Will major parts suppliers now be faced with a similar problem and be forced to pass along increased costs to car builders, thus further adding to the burden? At the moment, the policy seems to be to stand pat. GM has announced no immediate change in list prices of passenger cars is contemplated and all elements of cost are being studied in an effort to maintain this policy. This thinking does not necessarily include divisions making other products. They will have to make their own decisions in the light of their new costs. Thus, the electrical products divisions, which have just announced a 5 per cent reduction in appliances and motors will be faced with the same labor increase as automotive divisions and will be in for a double squeeze.

Chrysler Resumption Delayed

Auto production losses as result of the Chrysler strike mounted further as Chrysler plants continued idle last week due to damage to steam power plants resulting from sudden abandonment at the start of the strike. Repairs were scheduled to be completed and production resumed June 7. The extra week's idleness means not only additional wage losses for Chrysler workers but also that about 18,000 new car customers will wait longer for deliveries.

Fords To Be Unveiled

This is the big week at Ford Motor Co. At the Waldorf in New York plans are being made for an all-out celebration and display where every known touch of artists and promotion experts has been drawn on to out-do anything of this nature the industry has known. Don't be surprised if you read of a 1949 Ford driving up Fifth Avenue with the *Queen Mary* lashed on top.

Official release date for exact details and pictures of the cars is Wednesday but it is breaking no serious confidence to mention a few facts concerning them. Despite much

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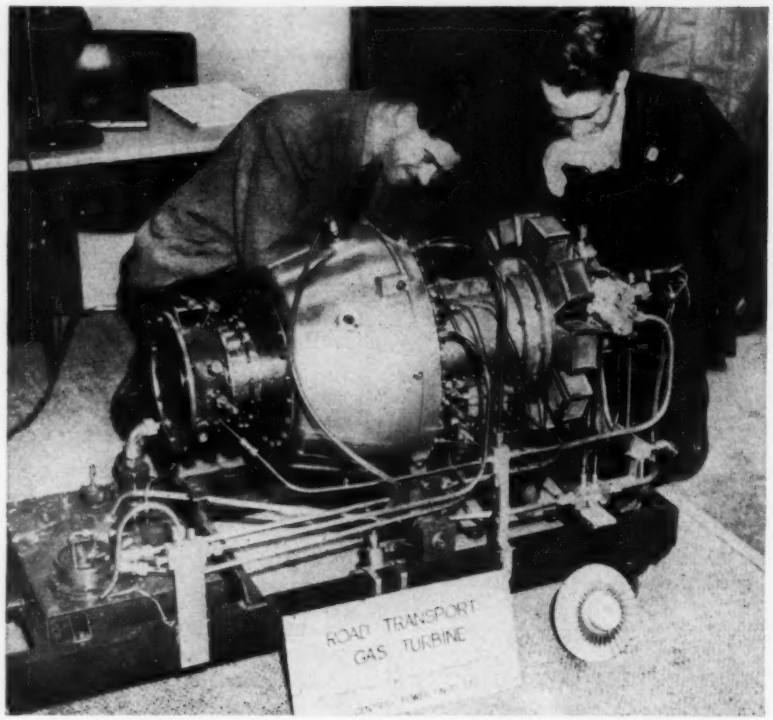


GAS TURBINE AUTO ENGINE: Visitors at the British Industries Fair at Birmingham, Eng., examine a gas turbine engine for automobiles. Its inventors claim it will eliminate gears, clutch, radiator, pistons, cylinders, spark plugs, exhaust fumes and vibration from cars. The power plant is 5 feet long, 7 inches square, weighs 250 pounds and will develop 160 horsepower. NEA photo

wider hip and shoulder room in bodies, the cars actually will be slightly narrower, and will have narrower tread by 2 inches in the front. Weight has been reduced by nearly 250 pounds; springing is independent coils in front, with shock absorbers inside the coils, and longitudinal leaf units in the rear. Hotchkiss drive replaces the old torque tube drive, as it has in the Lincoln and Mercury.

An interesting change has been made in the exhaust manifolding of the Ford V-8 engine, with the exhaust line from one bank of four cylinders curved around the front engine and then back to join the line from the other bank of cylinders. A thermostat at the juncture serves to produce a slight back pressure on the exhaust from one bank of cylinders, aiding during the warmup period.

Substantial improvements have been made in the heating and air control systems for body interiors, which could likely set new standards for the industry.

To develop and produce the 1949 line of passenger cars, the company has thus far expended more than $37.4 million in tools, dies, jigs and fixtures, and it is considered likely that additional body types will be forthcoming later in the year, beyond those which will be shown this month, which include only three basic body types in the standard series and four in the custom series.

Automatic Transmission

Possibility of an early announcement by Packard of an automatic transmission is seen in the news that the company has organized an automatic transmission division, and has appointed E. G. Patzkowsky as manager. At a press conference last September George T. Christopher, Packard president, disclosed his organization had developed a passenger car transmission of the infinitely-variable type but indicated production would be deferred until all the "bugs" had been engineered out of it. Apparently, it has taken longer to do that than he believed at that time, for it will now be Patzkowsky's assignment to obtain the engineering release for the transmission, form a manufacturing organization, acquire machinery, tool it up and get production under way. He has been industrial relations manager for the company since September, 1944, and will be succeeded in that post by C. Wayne Brownell, hitherto labor relations manager. Mr. Patzkowsky's qualifications for heading the transmission operations spring from his long experience in the Packard gear division, both automotive and aircraft engine.

Improved Synthetic Treads

Tire treads of a new synthetic rubber produced at low temperatures, which are claimed to outwear the best natural rubber treads, possibly by as much as 30 per cent, have been publicized by the United States Rubber Co. here. Developed by the rubber, chemical and petroleum industries under direction of the Office of Rubber Reserve, the material is made by the polymerization of butadiene and styrene just as was the original general-purpose synthetic, the polymerization temperature being much lower, changing the structure of the material to reduce cracking, increase strength and resistance to abrasion.

New Plant To Open

Newest Buick-Olds-Pontiac assembly plant in the South will be opened formally this month, at Doraville, Ga., on the outskirts of Atlanta. Now in volume production, the plant employs 1500 and covers an area of more than 17 acres.

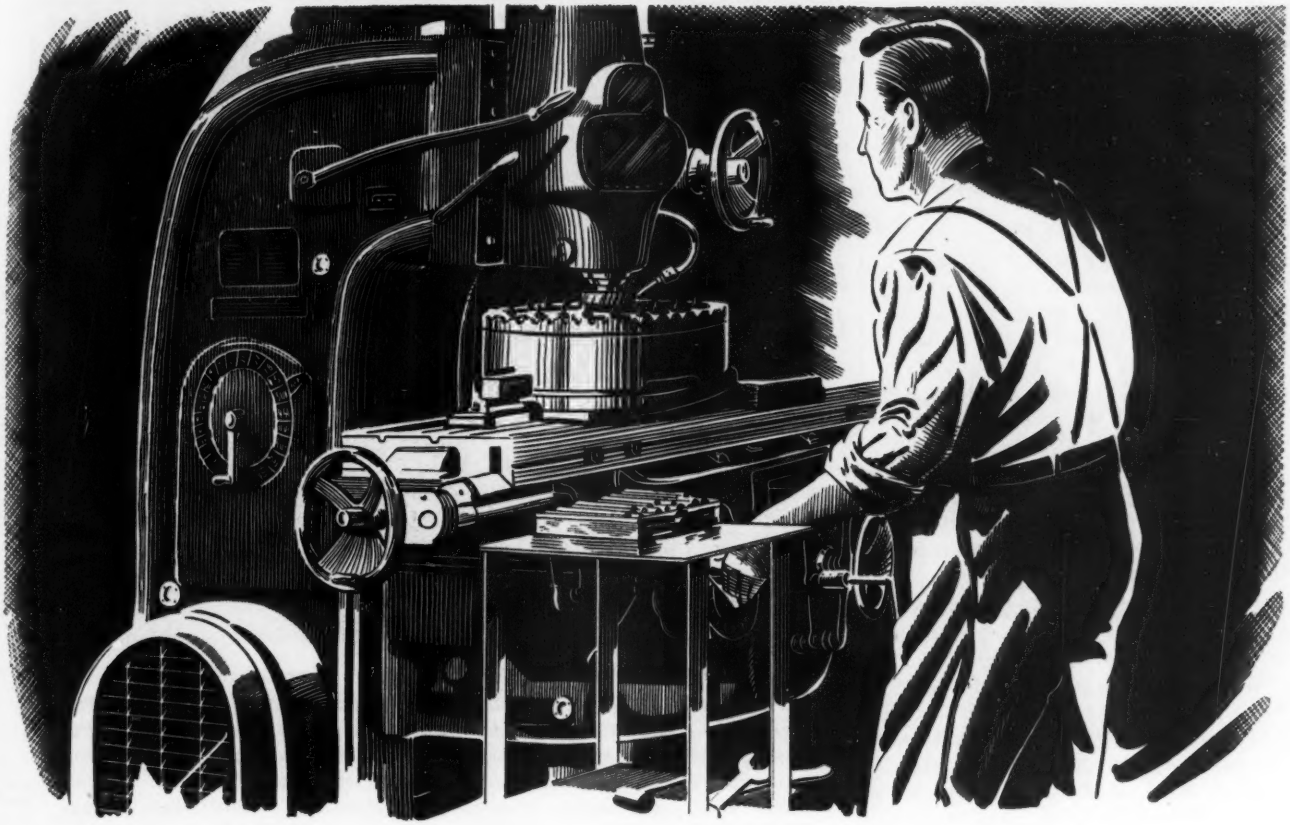
GM May Change in September

Final releases for the current model run have been issued by Fisher Body Division of GM and, according to present figuring, will cover the period July-August. On the basis of this outlook, a model change would be in store early in September for all the General Motors passenger car units except Cadillac and the Oldsmobile Futuramic series. This is somewhat earlier than had been looked for and may indicate decision by GM to resume late summer model changes.

Despite the complete lack of confirmation around Detroit, reports persist in the East that Cadillac will revise its rear fender design in the fall, eliminating the "lighthouse" tail lights and returning to more conventional contours. New dies probably would not be required, since the old ones could be modified.

Briggs Books Willys Contracts

Contract for production of all-steel station wagon bodies for Willys-Overland Motors has been booked by Briggs Mfg. Co. and production at its Meldrum plant is being contemplated on a schedule of 250 daily. These bodies formerly were built by Hayes Mfg. Co. at Grand Rapids, Mich., which in the meantime has taken on additional stamping business for both Ford and Studebaker.



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The Union Chain and Manufacturing Company

TRANSMIT POWER
UNION CHAINS
CONVEY MATERIALS

Sandusky, Ohio, U.S.A.

Bliss Expands Production at Toledo Plant

MORE THAN 150 executives representing the leading manufacturers of sheet metal products in the Midwest area, together with a group of industrial editors, attended E. W. Bliss Co.'s "open house" at its Toledo, O., plant May 28. They were taken on a conducted tour of manufacturing operations beginning at the pattern shop, moving on through foundry and laboratory, then continuing through the main plant on Dorr and Hastings Streets to observe the large machine shops and assembly floors.

Invests $1,250,000 — Bliss, reputed to be the world's largest manufacturer of mechanical and hydraulic presses, has invested approximately $1,250,000 in equipping its Toledo division with modern heavy machine tools, foundry equipment and rearranging plant layout Addition of sand conditioners, sand slingers, oil heated core ovens and new cupola will contribute approximately 25 per cent to the foundry production. Test bars made in this foundry are subjected to physical and chemical tests designed by Meehanite Metal Corp. to control the properties of each casting.

Combined capacities of the Toledo and Hastings, Mich., foundries now provide castings for manufacture of presses in Bliss plants at Cleveland and Salem, O., which, together with the Salem Weldment plant, gives Bliss highly integrated operation and control over all phases of its operations.

Large turret lathes, planers, boring mills and gear cutting equipment installed at the Toledo plant in recent months represent a capital investment of approximately $900,000, according to Marshall M. Smith, president, who was host to the visitors at a buffet luncheon during the Toledo "open house."

Flow of Materials Improved—Improved flow of materials from the rough casting through the various machining operations to assembly and shipping departments has been achieved by an extensive rearrangement of machinery and aisle space. At the termination of the plant tour, guests were invited to inspect several 500-ton forming presses in the final stages of erection prior to shipment to Studebaker Corp., South Bend, Ind.

Robert Hinde, works manager, aptly described Bliss operations in Toledo as a "large job shop building sheet metal working equipment on a custom-built basis." While the tour was in progress 1015 day shift employees, including 60 engineers, were at work.

THIRTY-YEAR MILESTONE—W. J. Sampson Jr., president, left, and Don W. Dawson, sales promotion manager, examine one of the many product exhibits presented at an open-house held in the observance of American Welding & Mfg. Co.'s thirtieth anniversary in Warren, O. During the event two 30-year "old-timers" were presented with gold watches. Some 7340 customers, suppliers, neighboring industrialists, wives, children and press representatives toured the plant which was in full operation during the 8-hour celebration

Expansion Part of Wide Program—Plant expansion at Toledo is an important phase of the company-wide program resulting from Bliss management's decision to cease operations at the Brooklyn, N. Y., plant in order more economically to serve the heavy concentration of high production by metalworking industries in the Midwest. Similar new equipment programs have also been completed at the company's plants in Salem and Hastings.

The Bliss Toledo division is known locally as Toledo Machine & Tool Co., under which name it operated for years prior to its consolidation with Bliss. This Toledo division was founded in 1888 and operated under Henry J. Hinde. The plant has been running at capacity since 1938. Operations now proceed through two shifts daily.

Research Program Seeks Faster Freight Cars

Railroad equipment manufacturers and American Steel Foundries, Chicago, will collaborate on a research program designed to make freight cars speedier, safer and smoother riding.

This was announced by the Association of American Railroads whose Mechanical Division is directing the tests. A spokesman for the division said the program's cost would be "substantial."

Both laboratory and road tests of equipment will be conducted. American Steel Foundries' rolling laboratory of five especially equipped freight cars will be used in the experiments. Proving ground for the road tests will be a 67½ mile stretch on the Illinois Central Railroad.

WAA Rejects All Bids on Cleveland Blast Furnace

War Assets Administration has rejected all bids for the government-owned blast furnace and by-product coke oven plant at Cleveland. Republic Steel Corp., the furnace's wartime operator, continues to operate the facility under lease.

Two bids had been received—one from Republic and the other from Tucker Corp., Chicago. The latter company had been depending on acquisition of this plant as a main source for its iron requirements.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Lear Inc., Grand Rapids, Mich., manufacturer of aircraft parts, has acquired Romec Pump Co., Elyria, O., on a stock exchange basis. J. H. Lyons, former president of Romec, continues as manager of Romec Pump Division, and he also will be vice president of **Lear.**

—o—

Pittsburgh Consolidation Coal Co., Pittsburgh, has purchased for $1,235,000 Porter Coal Co., Consolidated Fuel Co., Kenvale Coal Co., Kenvale Mining Co. and Cadiz Mining Co., which have strip mining properties in Jefferson county and other parts of eastern Ohio.

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Permold Co., Medina, O., manufacturer of aluminum permanent mold and sand castings, has purchased control of D-S-C Industries Inc., Ghent, O., manufacturer of aluminum pistons.

—o—

Northern Steel Co. Inc., processor and distributor of sheet and strip steel, has moved to new offices and warehouse at 11070 Harper Ave., Detroit.

—o—

Turner Construction Co., Boston, has opened a Chicago office at 105 W. Adams St. R. L. Cullum is district manager.

—o—

Cosa Corp., New York, sales representative in the United States for many Swiss manufacturers of machine tools and measuring instruments, announces that it will represent the following Swiss firms in Canada as well: Andre Bechler, Friedrich Gygi, Societie Genevoise D'Instruments de Physique and Sallaz Freres.

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C. O. Bartlett & Snow Co., Cleveland, manufacturer of materials handling equipment and other products, has moved its Detroit office to 2457 Woodward Ave. J. J. Watson is Detroit representative.

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Alco Products Division, Dunkirk, N. Y., American Locomotive Co., has manufactured more than ten miles of electric-welded steel water pipe which has been installed at the new International Airport at Idlewild in Queens, New York.

—o—

Superweld Corp., newly formed with a capitalization of $500,000 to engage in the electric copper brazing of steel and in the manufacture of special metal products, has purchased all the furnaces and brazing equipment of Warner Welded Products, and has leased a building at 708 Hawthorne St., Glendale, Calif. Walter T. Wells, chairman and a founder of Lane-Wells Co., is president and general manager of the firm.

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Textile Machine Works, Berkshire Knitting Mills and **Narrow Fabric Co.,** all of Reading, Pa., have published "Industrial Berks County," a book which tells of the 200 years of industrial development in Berks county, Pa.

—o—

DeVilbiss Co., Toledo, O., manufacturer of paint spraying equipment and other products, has announced dates for its classes during the second half of 1948 for industrial finishers using DeVilbiss apparatus. Classes, lasting one week each, will begin on July 12, Aug. 9, Sept. 13, Oct. 11 and Dec. 13.

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Pittsburgh Tube Co. has moved its general offices to the Keystone Hotel Bldg., Pittsburgh.

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Montgomery Elevator Co., Moline, Ill., manufacturer of elevators and related equipment, has moved its San Francisco office to 735 Tehama St. G. A. Mizer is branch manager.

—o—

Wiesner-Rapp Co. Inc., Buffalo, has acquired Farnham Mfg. Co., Buffalo. Purchase will enable Wiesner-Rapp to more than double production of textile equipment and fabricated metals. Farnham's machinery line will continue to be manufactured, sold and serviced by Farnham Mfg. Division of Wiesner-Rapp.

—o—

Plasteel Products Co., Washington, Pa., manufacturer of roofing, siding and accessories, has appointed New Jersey Steel Co., Camden, N. J., as its distributor in the Camden area.

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Greer Steel Co., Dover, O., producer of cold-rolled steel, has moved its Detroit warehouse to 1520 E. Nine Mile Rd., Ferndale, Mich.

—o—

Symington-Gould Corp., manufacturer of steel castings for railroad, automotive and industrial use, plans to sell its $5 million foundry and machine shop at Rochester, N. Y., through Asset Realization Co., Newark, N. J. Symington-Gould will henceforth center its operations at its Depew, N. Y., factory.

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Office of Small Business, U. S. Department of Commerce, has issued "Small Business and Trade-Marks," a pamphlet which sets forth advantages to be gained and the pitfalls to be avoided by manufacturers and distributors in the use of distinctive trademarks.

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General Motors Corp., Detroit, reports that $4 million has been granted its employees thoughout the country during the past six years for 100,000 acceptable suggestions.

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Hannifin Corp., Chicago, has appointed Jack J. Kolberg Co., Seattle, as its representative for hydraulic and pneumatic power and production equipment in Washington, Oregon and Idaho.

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American Nickeloid Co., Peru, Ill., manufacturer of pre-plated metals, has added nickel and chrome-plated aluminum sheet to its line. Manufactured prior to 1941, these products were discontinued during the war.

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Monsanto Chemical Co., St. Louis, has purchased a synthetic rubber pilot plant at Springfield, Mass., for $169,500 from War Assets Administration.

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White Metal Mfg. Co., Hoboken, N. J., manufacturer of metal can spouts and collapsible tubes for pharmaceutical and industrial products, has appointed H. J. Fouts & Co., Los Angeles, as its exclusive representative in California.

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Automatic Washer Co., Newton, Iowa, manufacturer of household washers, expects to begin production before July in a recently leased plant in Mason City, Iowa. Company states that daily output will reach 200 units within a month.

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American Standards Association, New York, has published a list of all national standards it has approved. The list is available free of charge.

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TempRite Mfg. Co. Inc., Arkansas City, Kans., manufacturer of portable coolers, has changed its name to Acton Mfg. Co. Inc. Change was made because of trademark complications.

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Federal Housing Administration reports that 35,555 dwelling units were started during April, largest number begun in any one month under FHA inspection.

The Business Trend

PRODUCTION GAINS made in the week ended May 29 by several important industries were insufficiently large to be reflected in the overall level of industrial activity, STEEL's index remaining unchanged at 162 per cent (preliminary) of the 1936-1939 weekly average. Valid comparisons of production and trade figures in the latest week with last year's corresponding week cannot be made because effects of the Memorial Day holiday this year will not be noticeable until the June 5 week.

STEEL—In the week ended May 29, rate of steel ingot production edged up one point to the level achieved at the beginning of the March-April coal strike. Steel requirements of industrial consumers continue beyond available supplies, with the unbalance expected to intensify as more drains are imposed by military projects and preferential industry programs. Curtailments in metalworking operations are reported in increasing numbers on the West Coast as a result of lack of ferrous materials.

PETROLEUM—For the second consecutive seven-day period, average daily crude oil production set a new high in the week ended May 22, according to the American Petroleum Institute. Daily production in that week was 5,439,200 barrels, up 16,600 barrels from the preceding week. Refinery runs, however, dropped 53,000 barrels a day from the record of 5,587,000 barrels a day set in the previous week.

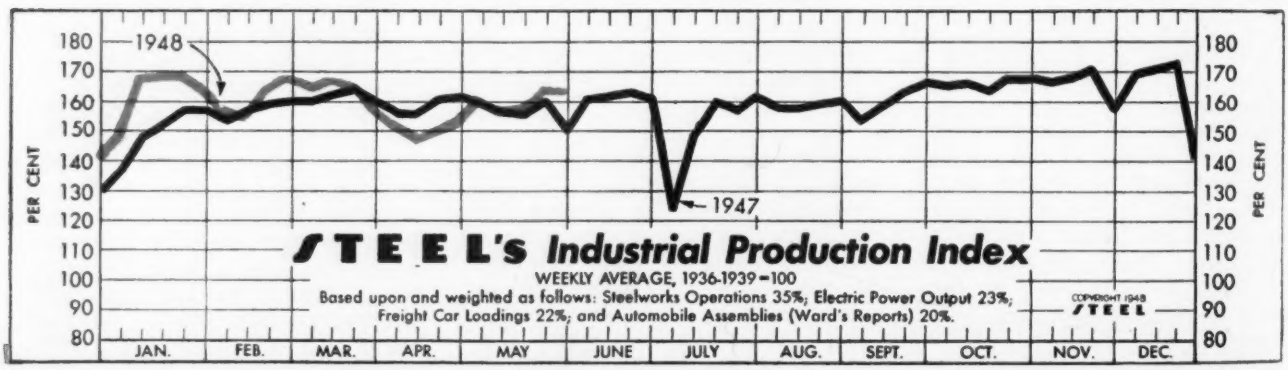
PRODUCTION—Reflecting chiefly lower output of iron and steel resulting from the coal miners' walkout, the Federal Reserve Board's seasonally adjusted index of industrial production dropped 5 points in April to 187 per cent of the 1935-1939 average. The index for May will recover to around 190 per cent, the board estimates.

COAL—Production of bituminous coal was up to 13,670,000 net tons in the week ended May 22, a 3.2 per cent increase over the preceding week. Production in the corresponding week last year was 12,770,000 tons. Total 1948 production through May 22 was 215,498,000 tons, compared with 251,650,000 tons for the corresponding period of last year, according to the National Coal Association.

BUSINESS FAILURES—Dropping to 404 in April from the postwar high of 477 in March, business failures were nevertheless more numerous than in any other April since 1942, Dun & Bradstreet Inc. reports. Liabilities, however, declined to $15,296,000, the lowest figure reported, except for January, in the last six months.

GEAR SALES—A 17.7 per cent drop in gear sales was reported in April compared with March by the American Gear Manufacturers Association. The group's index, based on 1935-1939 bookings, registered 320.9 per cent.

BUILDING PERMITS—Valuation of building permits issued during April in 215 cities was $364,453,745, according to Dun & Bradstreet Inc. This volume has been exceeded only once (March, 1946) in the last 19 years.



Index (chart above): Week ended May 29 (preliminary) 162 Previous Week 162 Month Ago 160 Year Ago 150

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	96.0	95.0	87.0	95.5
Electric Power Distributed (million kilowatt hours)	5,070‡	5,085	5,042	4,429
Bituminous Coal Production (daily av.—1000 tons)	2,280	2,206	1,895	2,128
Petroleum Production (daily av.—1000 bbl.)	5,442‡	5,439	5,413	5,024
Construction Volume (ENR—Unit $1,000,000)	$189.9	$82.7	$183.2	$72.2
Automobile and Truck Output (Ward's—number units)	92,105	91,138	102,967	79,315

* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons. ‡ Preliminary.

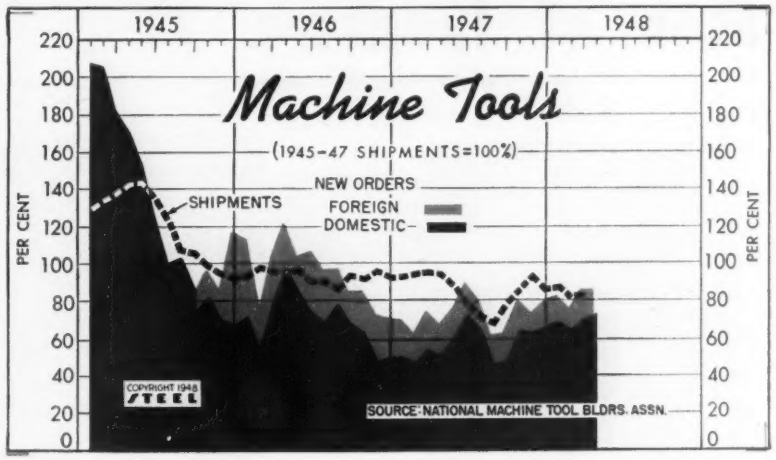
TRADE				
Freight Carloadings (unit—1000 cars)	870†	879	892	830
Business Failures (Dun & Bradstreet, number)	98†	92	106	72
Money in Circulation (in millions of dollars)‡	$27,700	$27,690	$27,682	$28,211
Department Store Sales (change from like wk. a yr. ago)‡	+7%	+8%	+11%	+13%

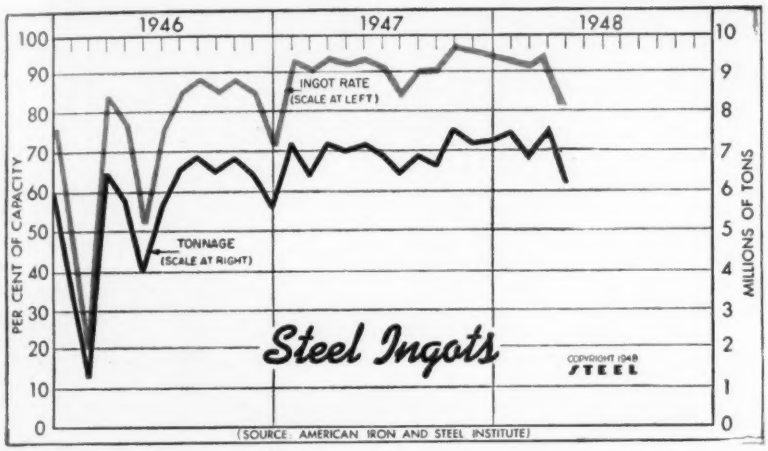
† Preliminary. ‡ Federal Reserve Board.

Machine Tools

(1945-47 Shipments = 100)

	Orders—Total		Orders—Domestic		Shipments (3 Mos. Ave. Centered)	
	1948	1947	1948	1947	1948	1947
Jan.	83.1	71.7	69.1	50.7	86.9	93.1
Feb.	77.3	63.8	64.6	48.0	81.9	94.8
Mar.	86.3	74.3	70.2	54.2	84.2	95.4
Apr.	86.3	69.8	72.2	51.0	...	94.3
May	...	76.9	...	60.6	...	88.9
June	...	90.9	...	73.7	...	79.5
July	...	81.1	...	64.4	...	71.0
Aug.	...	62.1	...	47.5	...	68.6
Sept.	...	63.7	...	49.0	...	78.5
Oct.	...	81.0	...	65.0	...	85.5
Nov.	...	75.6	...	64.1	...	92.6
Dec.	...	81.1	...	66.3	...	86.1



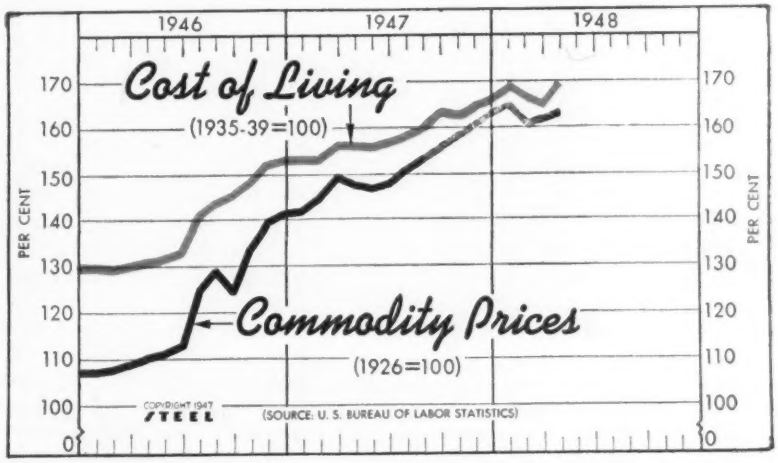


Steel Ingots

	Production (Net Tons—000)			Operating Rate (% of Capacity)		
	1948	1947	1946	1948	1947	1946
Jan.	7,473	7,213	3,873	93.6	93.0	49.6
Feb.	6,940	6,422	1,393	93.0	91.7	19.8
Mar.	7,608	7,307	6,509	95.3	94.3	83.3
Apr.	6,230	7,043	5,861	80.6	93.8	77.5
May	....	7,329	4,073	...	94.5	52.2
June	....	6,969	5,626	...	92.8	74.4
July	....	6,570	6,619	...	84.9	84.9
Aug.	....	6,982	6,924	...	90.1	88.7
Sept.	....	6,789	6,556	...	90.6	86.9
Oct.	....	7,560	6,952	...	97.5	89.0
Nov.	....	7,233	6,458	...	96.3	85.4
Dec.	....	7,366	5,760	...	95.2	73.9
Total		84,784	66,603	Ave.	92.9	72.5

Wholesale Commodity Price—Cost of Living Indexes

	—Commodities— (1926=100)			—Living Cost— (1935-39=100)		
	1948	1947	1946	1948	1947	1946
Jan.	165.7	141.5	107.1	168.8	153.3	129.9
Feb.	160.8	144.5	107.7	167.5	153.2	129.6
Mar.	161.4	149.5	108.9	166.9	156.3	130.2
Apr.	162.7	147.7	110.2	169.3	156.2	131.1
May	....	147.1	111.0	....	156.0	131.7
June	....	148.0	112.9	....	157.1	133.3
July	....	150.8	124.7	....	158.4	141.2
Aug.	....	153.6	129.1	....	160.3	144.1
Sept.	....	157.4	124.0	....	163.8	145.9
Oct.	....	158.5	134.1	....	163.8	148.6
Nov.	....	159.7	139.7	....	164.9	152.2
Dec.	....	163.2	140.9	....	167.0	153.3
Ave.	....	151.8	120.9	....	159.2	139.3



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$14,103	$14,731	$13,790	$11,693
Federal Gross Debt (billions)	$252.2	$252.2	$252.2	$258.3
Bond Volume, NYSE (millions)	$28.4	$28.7	$22.6	$13.4
Stocks Sales, NYSE (thousands)	8,234	13,372	7,639	2,998
Loans and Investments (billions)†	$63.5	$63.2	$63.5	$63.0
United States Gov't. Obligations Held (millions)†	$35,866	$35,499	$35,643	$39,226

† Member banks, Federal Reserve System.

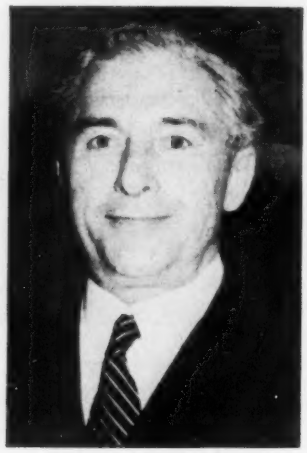
PRICES

STEEL's composite finished steel price average	$80.27	$80.27	$81.14	$69.82
All Commodities†	163.5	163.5	163.6	146.9
Industrial Raw Materials†	178.6	177.7	177.8	160.3
Manufactured Products†	158.7	159.0	158.9	142.1

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

GEORGE J. SCHAD



FRANK J. KENNEDY

JOHN P. JONES JR.

George J. Schad has been elected treasurer and a director, Tinnerman Products Inc., manufacturer of Speed Nuts, Cleveland. He has been with the company for 16 years, and prior to his election as treasurer, was assistant treasurer and comptroller.

—o—

Norman A. Evans has been elected vice president in charge of sales, Pressed Steel Tank Co., Milwaukee. He joined the firm in 1931 as district sales manager at New York, and in 1939 was transferred to Milwaukee as general sales manager.

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J. F. Mattern has resigned his position of vice president, general manager and treasurer, Vulcan Soot Blower Corp., Dubois, Pa., to resume management consulting service.

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James N. Trimble has been appointed branch manager, Berger Mfg. Division, Republic Steel Corp., to handle sales of steel equipment products in the Chicago district. **Ralph C. Braden Jr.** has been appointed Kansas City, Mo., district sales manager for the division.

—o—

Minneapolis-Honeywell Regulator Co., Minneapolis, announces the following personnel changes: **Kent L. Wilson** has been promoted to manager, southwest region, with headquarters in Dallas, Tex. He is succeeded as manager of the Detroit branch by **T. S. Carley,** who has been sales manager of the Stoker and Wholesale Divisions at the home office. **Walter J. Baak,** who has been Moduflow sales manager, midwestern region, with headquarters in Chicago, has been promoted to sales manager, Wholesale Division. **G. M. Kingsland,** head, sales activities, control devices and specialties departments, is taking over new duties in the Heating Controls Division. **William S. Robards** has been appointed Milwaukee branch manager. He succeeds the late **L. C. Johnson.**

—o—

Frank J. Kennedy, manager of the engineering department, Ambridge, Pa., plant, National Electric Products Co., has been elected a vice president. He joined the company in 1919 after association with Mesta Machine Co., at its Homestead works. After serving in various capacities, including manager of the New York sales office, Mr. Kennedy returned to the Ambridge, Pa., plant in 1941 to co-ordinate the engineering department's development program. As manager of the department, he has supervised the engineering phases of both product development and new plant facilities. **George L. Wanamaker,** since 1926 assistant to the president, has also been elected a vice president of the corporation. Mr. Wanamaker joined the organization in 1907 at the Ambridge plant.

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Raymond E. Valentine has been appointed district sales manager at the St. Louis office of National Malleable & Steel Castings Co., Cleveland. **Howard Stark,** field engineer at the Chicago office, has been named assistant district sales manager at St. Louis.

—o—

Cold Metal Products Co., Youngstown, producer of cold-rolled strip steel, announces appointment of **E. L. Phillips** as assistant manager of sales. He formerly was production manager. **A. C. Prudner,** formerly assistant production manager, has been appointed manager of the order department.

—o—

John P. Jones Jr. has been appointed industry manager, Housewares Division, Reynolds Metals Co., Louisville, succeeding **Robert D. Becker,** resigned.

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At the annual meeting of the stockholders and directors, Carlton Machine Tool Co, Cincinnati, the following directors and officers were elected: **Mrs. Katherine G. Carlton, Mary Katherine Carlton, Frank Moran, William A. Dermody,** and **Fred W. McIntyre Sr.** were elected directors. Mr. Dermody was also elected president and general manager, succeeding the late **Jack C. Carlton,** president. Mr. Moran was elected vice president and treasurer, **James V. Carlton,** secretary, and **Mary Katherine Carlton,** assistant treasurer.

—o—

John T. Ryan Jr. has been elected executive vice president, Mine Safety Appliances Co., Pittsburgh. He joined the company in 1936, and had served in various executive capacities before his present appointment.

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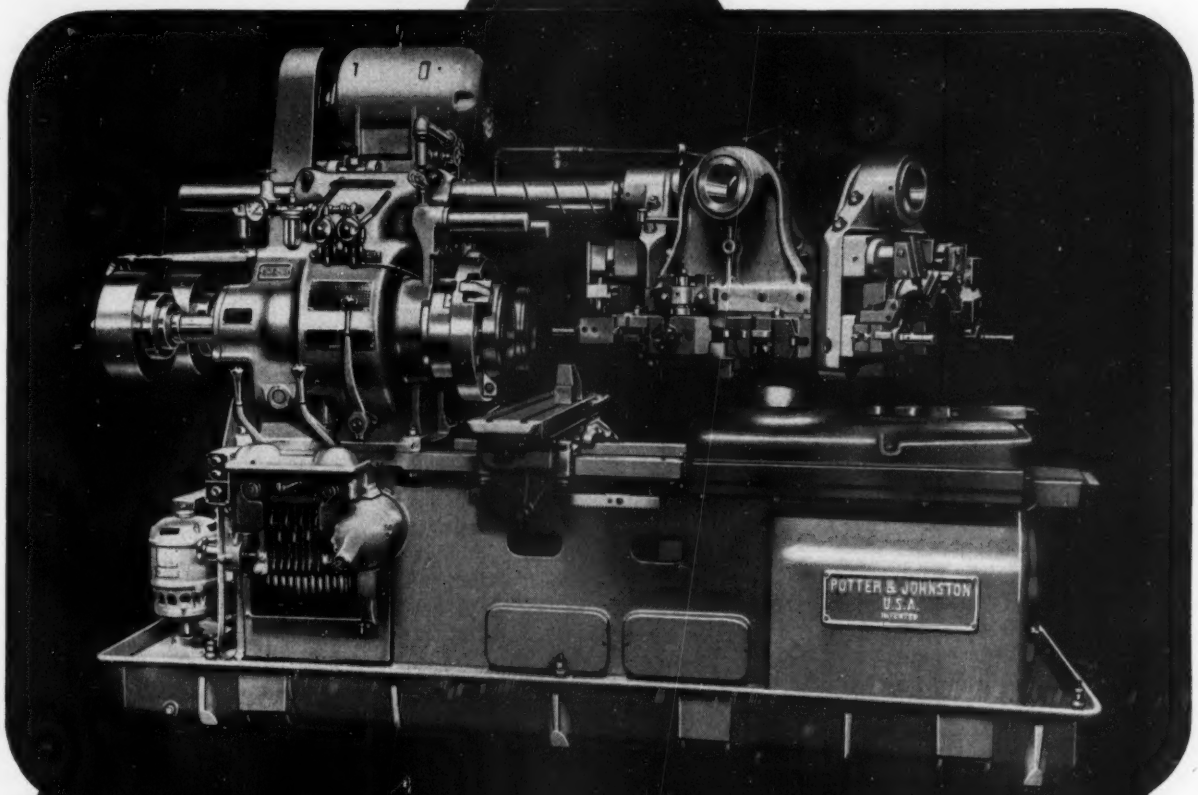
Robert L. Sutman has been appointed assistant treasurer, Rockwell Mfg. Co., Pittsburgh. He joined the company in 1947 as a member of the audit staff, and later was a member of the controller's staff.

—o—

F. W. Bremmer has been named works manager, Ambridge, Pa., plant, National Supply Co., Pittsburgh, succeeding **W. M. Frame,** resigned. **Harold R. Beachler** has been appointed works manager of the company's

Three important angles to consider on P.&J.'s productive



5D-2

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2
3

SPECIFICATIONS		5D-2-9	5D-2-12	5D-2-15
BED	swing over: dia. of work limited by spindle	21 1/2"	21 1/2"	28"
	to spindle center distance	10 1/2"	15 1/2"	15 1/2"
CROSS SLIDE	travel each way	5"	5"	5"
TURRET	no. of faces	5 & 6	5 & 6	5 & 6
	slide travel	11 1/2"–8 3/4"	15 3/4"	15 3/4"
TOP SPINDLE SPEED		615 rpm.	613 rpm.	525 rpm.

The primary function of a machine is to make money for the owner. In order to make money, however, it has to produce work a little better, a little faster and a little more economically than comparable machines. For specific work, in this instance the machining and finishing of castings and forgings up to 15¼" dia., POTTER & JOHNSTON'S rugged and rigid 5D-2 SPINDLE POWER-FLEX AUTOMATIC TURRET LATHE has no superior. It has been designed to meet production requirements. Every machine has power, great rigidity, 4 automatic changes of spindle speed while under cut; 3 selective automatic changes of feed; automatic binding of the turret following index; powerful, direct cross slide action and a constant high speed motion to the cross slide and turret slide. This machine will bear close investigation by cost-conscious manufacturers. Write for complete information.

POTTER & JOHNSTON CO.
PAWTUCKET, RHODE ISLAND
Subsidiary of
PRATT & WHITNEY
Division Niles—Bement—Pond Company

Etna, Pa., plant, succeeding Mr. Bremmer in that position.

—o—

Donald P. Hess, president, American Bosch Corp., has been elected to the board of directors, Hungerford Plastics Corp., Murray Hill, N. J., and has been made chairman of the executive committee.

—o—

Walter G. Schlichting has been appointed sales manager, Heating, Cooling and Air Conditioning Division, Young Radiator Co., Racine, Wis. He has been manager of the Air Conditioning Division, Clarage Fan Co., Kalamazoo, Mich.

—o—

Officers elected to the Industrial Research Institute Inc. are: **E. W. Engstrom,** vice president, research, RCA Laboratories Division, Radio Corp. of America, elected president, and **J. H. Schaefer,** vice president and general manager, manufacturing department, Ethyl Corp., elected vice president for the ensuing year; **C. G. Worthington** was reappointed secretary and treasurer; **C. F. Rassweiler,** vice president, research and development, Johns-Manville Corp., and **Alex. Stewart,** director of research, National Lead Co., were elected to three-year terms on the board of directors.

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Sam Schuller has been appointed technical director of the combined operations of Paisley Products Inc., Chicago.

—o—

John M. McDonald has been elected vice president, Buchen Co., Chicago, and **Leon Morgan,** treasurer. Mr. McDonald became associated with the company in 1923, and Mr. Morgan has been with the company 11 years. Both also are account executives of the company.

—o—

Allan A. Watson has been appointed sales manager, Trumbull Electric Mfg. Co., Plainville, Conn., responsible for all field sales operations of the company. He joined the firm in 1936. Following military service during World War II, Mr. Watson was appointed manager at the company's Norwood, O., plant in 1946.

—o—

Bailey Meter Co., Cleveland, has opened a new branch office in Charlotte, N. C. **J. R. Powell** has been appointed branch manager, and will be assisted by **R. T. Cathey.**

—o—

Joseph G. Hammond has retired from Buick Motor Division, General Motors Corp., after 35 years of service with the division. He started with the company in 1913, and has been assistant general manufacturing manager at Flint, Mich. During the war he was production chief at the Buick aviation engine plant in Melrose Park, Ill.

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Albert McMillan, Shawinigan Chemicals Ltd., Montreal, Canada, has been awarded the 1947 James Turner Morehead Medal for his outstanding pioneering work in building, and in operating efficiently some of the first major acetylene generating plants in the industry's history.

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Richard C. Lindberg, attorney, specializing in patent, trademark, copyright and unfair competition law, has moved his office from 10 S. LaSalle St., Chicago, to 3200 Bankers Bldg., 105 W. Adams St., same city.

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Dr. Harold K. Work, manager, research and development, Jones & Laughlin Steel Corp., Pittsburgh, has been nominated as president, American Society for Metals. Other nominations are as follows: **Dr. Arthur E. Focke,** research metallurgist, Diamond Chain & Mfg. Co., Indianapolis, nominated for vice president; **W. H. Eisenman,** present secretary, nominated for his 16th consecutive two-year term in that office; **Dr. Harry Croft,** director, technical control and research, Chase Brass & Copper Co., Cleveland, and **Frederick J. Robbins,** manager, Sierra Drawn Steel Corp., Los Angeles, nominated for two-year terms as national trustees of the ASM. Dr. Work, when elected, will succeed **Francis B. Foley** of Philadelphia, Midvale Corp. executive.

—o—

Fred G. Rumball has been appointed head of West Coast purchasing operations of Ford Motor Co. at Los Angeles, following retirement of **L. C. Disser** on Sept. 19, 1948. Mr. Rumball returned to industry after a three-year retirement. In 1945 he resigned as West Coast sales representative for Federal Bearing Co., Aircraft Division. Before joining Federal in 1933, Mr. Rumball had been with Timken Roller Bearing Co.

—o—

George A. Huggins has been appointed general manager, car works plant, Pullman-Standard Car Mfg. Co., Chicago. He has been with Douglas Aircraft Corp. in California for 20 years.

—o—

Dumore Co., Racine, Wis., announces the appointment of **Charles M. Jacobs** as purchasing agent. He joined the company in 1933, serving in the production and cost departments until a year ago, when he was made assistant purchasing agent. The company also announces the appointment of **Fred O. Orthey** as works manager.

—o—

Irving M. Footlik, instructor in materials handling engineering, Illinois Institute of Technology, and a member of the engineering staff, Ekco Products Co., Chicago, has been elected president of the newly organized Midwest Materials Handling Society.

—o—

William W. Criswell Jr. has been appointed sales representative, American Wheelabrator & Equipment Corp., Mishawaka, Ind. He will have offices in New York.

—o—

Tocco Division, Ohio Crankshaft Co., Cleveland, announces the opening of new offices in Detroit under the direction of **W. K. Ginman.** The new set-up includes complete engineering, sales and service facilities covering all phases of induction heating. Mr. Ginman had been associated with the Budd Co. in its Philadelphia and Detroit plants. Earlier this year Tocco purchased Budd's Induction Heating Division. Other personnel in the new Detroit office include **C. A. Tudbury,** district engineer; **Dr. A. W. Herbenar,** district metallurgist; **T. E. Olson,** engineering representative; **C. P. Bidle,** commercial engineer, and **R. Kazarian,** service engineer.

—o—

Tuttle & Kift Inc., Chicago, announces establishment of a West Coast headquarters to service the entire West Coast territory, as of July 1. **D. B. Kift,** executive vice president, will establish this office at Los Angeles. He was one of the organizers of Tuttle & Kift Inc. in 1937.

W. K. GINMAN

Triple-action drawing and forming of new Hudson tops in Bliss Toggle Press. Blank is held by outer slide while inner slide forms roof and dwells. Rear window is formed by third action in press bed.

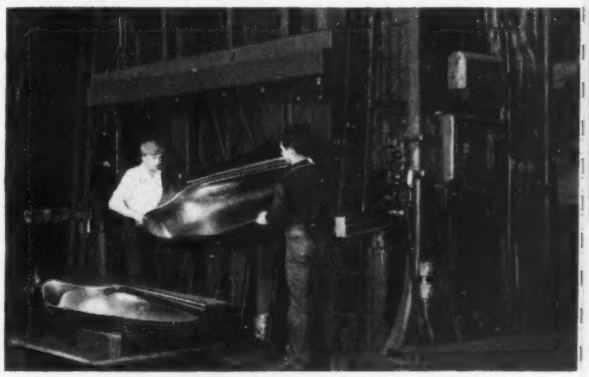
This time it's Hudson with 650 Bliss-Built Presses

From fender to top, just about every stamped part in a Hudson car is either blanked, formed, drawn or squeezed in one or more of the 650 Bliss-Built presses which total 97% of Hudson's entire press department.

"Bliss presses really stand-up under severe usage," says Hudson's master mechanic. "We've had them working 'around the clock' for several years during the war and since. Yet we've had little down-time due to press failure. They're simple to operate and maintain."

This overwhelming preference for Bliss equipment is duplicated in every pressed-metal-producing industry. It's because Bliss builds and delivers more than a press. Besides pioneering in press-construction improvements, Bliss provides a fund of engineering knowledge, going back over 90 years. "Bliss" on your press is more than a name—it's a guarantee. It will pay you to discuss your press problems with a Bliss press engineer.

Large and small end bosses on a forged connecting rod for a six-cylinder engine are compressed 3/64" in this 1200-ton Bliss-Toledo Knuckle Joint Press. Production averages 1133 per hour with an automatic chain-type feed.



Double action drawing of front fenders for the new Hudson also takes place in a Bliss-Toledo Toggle Press. Production averages about 180 per hour.

E. W. BLISS COMPANY, DETROIT 2, MICHIGAN

Mechanical and Hydraulic Presses, Rolling Mills, Container Machinery

WORKS AT: Toledo, Cleveland, Salem, Ohio; Hastings, Mich.; Englewood, N. J.; Derby, England; St. Ouen sur Seine, France. SALES OFFICES AT: Detroit, Hastings, Mich.; New York, Rochester, N. Y.; Cleveland, Dayton, Toledo, Salem, Ohio; Philadelphia, Pittsburgh, Pa.; Chicago, Ill.; New Haven, Conn.; Windsor, Ont.

MARQUETTE · BLISS · CONSOLIDATED
BLISS BUILT
TOLEDO

BLISS BUILDS MORE TYPES AND SIZES OF PRESSES THAN ANY OTHER COMPANY IN THE WORLD

and previously had been assistant works manager and director of purchases, Hotpoint Inc., Chicago. Mr. Kift will continue to function as executive vice president and a director of Tuttle & Kift Inc. Other organization changes announced by the company include the appointment of **Ross Blodgett,** formerly vice president-manufacturing, as vice president and assistant general manager; **John McKee,** formerly associated with Norge Division, Borg-Warner, named vice president in charge of sales and advertising; and **F. Martin Keyes,** advanced to the position of works manager from that of assistant works manager.

—o—

John B. Girdler, assistant general manager of sales, Vanadium Corp. of America, New York, has been appointed to fill the vacancy in Pittsburgh occasioned by the recent death of **G. A. Fritschi. Raymond H. Folsinger Jr.** has been appointed eastern sales representative of the corporation, with headquarters in New York.

—o—

M. J. Herbs has been appointed assistant export manager for E. W. Bliss Co., Detroit. He has been associated with the company for the past 11 years, and has held the positions of sales engineer and assistant to the production manager.

—o—

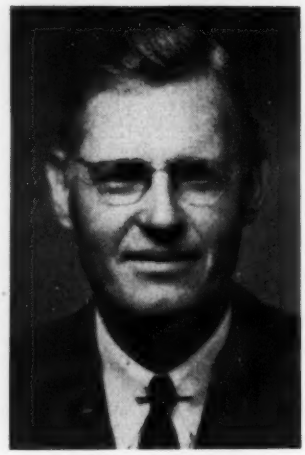
John E. Haines, vice president, Minneapolis-Honeywell Regulator Co., Minneapolis, has been appointed to the executive council, Federation for Railway Progress.

—o—

Cecil L. Johnson has been named to the staff of the director of manufacturing facilities and methods, Willys-Overland Motors Inc., Toledo, O. Formerly with Toledo Edison Co., he has been associated with Willys-Overland since 1940 and last June was promoted from assistant works engineer to works engineer. In his new post he will engage in special projects for the Operations Division. **Richard M. Hanselman** has been promoted to works engineer, succeeding Mr. Johnson, and **W. C. Giessler** has been named acting assistant works engineer.

—o—

George W. Crowl, assistant manager, pig iron sales, American Steel & Wire Co., Cleveland, subsidiary, U. S. Steel Corp., has resigned. He started selling pig iron for Corrigan McKinney Steel Co. in its Pittsburgh office in 1908, remaining with that company until 1935, when the late **J. S. McKesson** assumed the selling agency of pig iron for Carnegie-Illinois Steel Corp., and later for American Steel & Wire co. In 1945 the Wire company took over the direct selling of its merchant pig iron, and Mr. Crowl moved to Cleveland, assuming the position from which he now resigns.



GEORGE S. HASTINGS

Appointed a vice president, American Machine & Foundry Co., New York. Noted in STEEL, May 31 issue, p. 48

GEORGE SQUIBB

Appointed to the position of chief engineer, Detroit Broach Co., Detroit. Noted in STEEL, May 31 issue, p. 48

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Sawhill Mfg. Co., Sharon, Pa., announces appointment of **E. F. Resch** as vice president in charge of sales to succeed **W. D. Reed,** resigned. Mr. Resch had been associated with Mercer Tube & Mfg. Co. Recently he was named district sales manager for Mercer Tube & Mfg. Co. and Sawhill Mfg. Co. for the Philadelphia territory.

—o—

International Business Machines Corp., New York, has elected **John G. McPherson** a vice president of the company. He previously had been manager of patent research and development, and played an important part in the development of the company's selective sequence electronic calculator.

—o—

Ralph F. Koeneman has been appointed assistant chief engineer, Passenger Car Engineering Division, American Car & Foundry Co., at Berwick, Pa.

—o—

L. M. Skelton, for many years associated with Kester Solder Co., Chicago, as industrial solder engineer, has been appointed to represent Kester's technical service department in the field on a specialized basis.

—o—

H. T. Allison has been appointed sales representative of Permanente Products Co. at the Swan Island branch, Portland, Oreg.

—o—

Frank J. O'Brien, president and director, Metal & Thermit Corp., and Chromium Corp. of America, New York, has been elected a director, Norma-Hoffman Bearings Corp., Stamford, Conn.

—o—

Grenville R. Holden, vice president, Sylvania Electric Products Inc., New York, has been elected a director, Thorn Electrical Industries Ltd., London, Eng., in which Sylvania recently acquired a minority interest.

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B. O. Beck has been appointed manager, range section, Crosley Division, Avco Mfg. Corp., Cincinnati, succeeding **Philip W. Pugh,** resigned to become sales manager, Modern Distributing Co., independent distributors of Crosley products in the greater Cincinnati area.

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Howard R. Klepinger, superintendent of special assignments, American Steel & Wire Co., Cleveland, subsidiary, U. S. Steel Corp., has retired after more than 30 years' service with the company.

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R. P. Wolchina has been appointed factory manager, Conlon Bros. Mfg. Co., Chicago.

—o—

Walter H. Flynn has joined the sales organization of the Lebanon Steel Foundry, Lebanon, Pa. He formerly had been a sales and service engineer with Symington-Gould Corp., Rochester, N. Y.

—o—

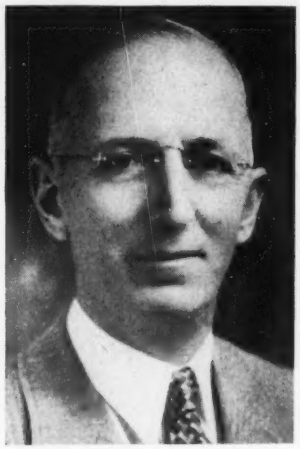
Ira G. Perin Co., San Francisco, announces appointment of **James W. Lafferty** as technical sales engineer. He has been assigned to the Los Angeles office.

—o—

Arthur J. Wieland, executive vice president, Willys-Overland Motors Inc., Toledo, O., has been elected

RUSSELL J. NADHERNY

Elected executive vice president and director of engineering and production, Barnes & Reinecke Inc., Chicago. Noted in STEEL, May 31 issue, p. 50



FORREST E. RICHMOND

Elected vice president, Revere Copper & Brass Inc., and executive head of that company's Rome, N. Y., Division. Noted in STEEL, May 24 issue, p. 82

C. PORTER PACKARD

Appointed Boston district manager, Crocker-Wheeler Electric Mfg. Co., Ampere, N. J., division, Joshua Hendy Corp. Noted in STEEL, May 17 issue, p. 64

chairman of the board of directors, Wilson Foundry & Machine Co., Pontiac, Mich., succeeding the late **Hiram J. Leonard.** Mr. Wieland previously had been vice chairman of the board at Wilson, which is a wholly-owned subsidiary of Willys-Overland.

—o—

Thomas J. Hilliard, vice president in charge of sales, Carnegie-Illinois Steel Corp., subsidiary of U. S. Steel Corp., has resigned. He joined Carnegie-Illinois in 1936 as manager of sales for the Pittsburgh district. He was made general manager of sales for the company in 1938, and was elected vice president in 1945.

—o—

Allison Co., Bridgeport, Conn., manufacturer of abrasive cutting wheels, has announced three personnel changes affecting the service and sales departments of the company. **Grant J. Casserly,** appointed to head the machine service department, will supervise installation of new abrasive cut-off machines and service machines already in operation. **Harold R. Powell** has been transferred from the research laboratory to the sales department to assist **H. Robert Powell,** vice president and sales manager. **Edward C. Scanlon,** formerly the company field engineer in northern New York State, has been transferred to the New Jersey territory.

—o—

Cincinnati Milling Machine Co. announces appointment of two regional managers for the Cimcool Division: **Ed Strieder** will manage the eastern region from the company offices in New York, and **Henry Schlachter** will manage the central region from the home office in Cincinnati.

—o—

Gilbert W. Chapman, former president, American Water Works Co. Inc., has been appointed vice president in charge of finance, Yale & Towne Mfg. Co., New York. He became president in 1947 of American Water Works Co. Inc. when it separated from American Water Works & Electric Co., with which he became associated in 1924.

—o—

H. F. Dobscha has been appointed assistant district manager, Cleveland district, Republic Steel Corp., succeeding the late **J. H. Slater** as assistant district manager, and also as chairman of the corporation's blast furnace committee. Mr. Dobscha has been superintendent of blast furnaces for Carnegie-Illinois Steel Corp.'s Edgar Thomson Works at Braddock, Pa.

—o—

Littleton C. Barkley has been appointed general sales manager, asbestos and rubber products, West Coast Division, Raybestos-Manhattan Inc., Passaic, N. J. Associated with the Manhattan Rubber Division for 23 years, Mr. Barkley has been until recently its sales manager for mechanical rubber products.

OBITUARIES...

Jules Dierckx, 77, president, Jules Dierckx Distributors, New York, a concern dealing largely with the Latin American machinery trade, died at New Canaan, Conn., May 21, as a result of a fall from a subway platform in New York which occurred several months ago. For many years he was sales manager, Keller Co., Brooklyn, now a division of Pratt & Whitney at Hartford. After the Keller operations moved to Hartford, Mr. Dierckx was for several years export manager for Chambersburg Engineering Co.

—o—

Austin W. Ford, 85, a director of International Business Machines Corp. since its inception, died May 24 at Binghamton, N. Y.

—o—

Edward H. Luders, 81, secretary-treasurer, Kelker Blower Co., Buffalo, died May 21. He was a former purchasing agent for Niagara Machine & Tool Co., Buffalo.

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Charles C. Loper, 49, Grand Rapids district manager, Central Steel & Wire Co., Chicago, died May 29 in Grand Rapids.

—o—

J. Driscoll DeWitt, 49, employment manager, Lackawanna plant, Bethlehem Steel Co., died May 31, when he was pinned under his two-ton automobile trailer at Crystal Beach, Ont.

—o—

Louis Rosen, 69, retired scrap metal dealer, Buffalo, died May 25. He founded Buffalo Metal & Rubber Co.

—o—

W. I. Brockson, executive vice president, Gebhardt & Brockson Inc., Chicago, died May 15.

—o—

Walter L. Conwell, 71, president, Safety Car Heating & Lighting Co., New York, died May 25 at his home in Montclair, N. J.

—o—

R. Stanley Smith, 64, engineer and designer, and head of his own business, Smith Precision Products Co., South Pasadena, Calif., died May 26.

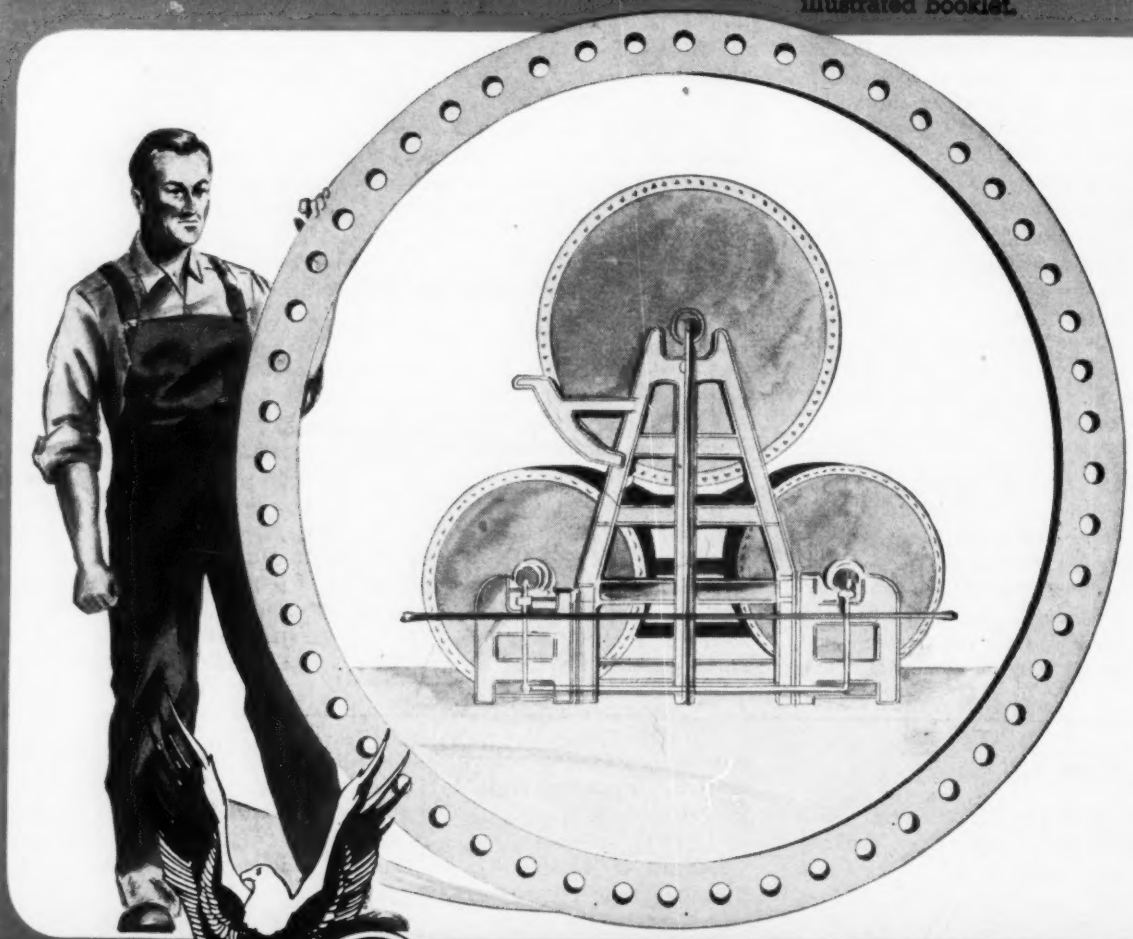
Textile Machinery Manufacturer Specifies

FLASH BUTT WELDED RINGS

by AMERICAN WELDING

Heavy duty cotton mill machinery demands uniform, rugged, close tolerance construction in 5′ and 7′ cylinder end rings . . . That's the reason for specifying "American" flash butt welding. Fabricated by our Controlled Technique, this is but one application of many ferrous and non-ferrous American Weldments made to strict customer specifications. Our 31 years of welding research, engineering and production is yours for the asking. A representative will be glad to call; or send us your prints and specifications for prompt recommendations and estimate.

Send
for 16 page
illustrated booklet.



THE AMERICAN WELDING
AND MANUFACTURING COMPANY
110 DIETZ ROAD • WARREN, OHIO

Engineering News . . . AT A GLANCE

"RIB OF STRENGTH"—A single wave rib incorporated on each side of a new steel reinforcing bar, now being rolled at each of Bethlehem Pacific's West Coast plants, is the factor that provides greater bond strength in concrete, it is reported. The improved reinforcing bar is essentially round in cross section with the three largest sizes equivalent in weight per foot to 1, 1 1/3 and 1½-inch squares. Bars are rolled exclusively from new billet steel in accordance with ASTM specification A-15-39, and in sizes conforming to practice recommendations of the Department of Commerce.

SINGLE-DRAW METAL—In the field of deep drawing, it is found that any draw that can be made in aluminum, brass or steel can be made in magnesium. Brooks & Perkins Inc., Detroit, reports that many deep draws which would require from three to four operations using other metals can be made in one operation in magnesium and with only one set of draw dies. Because of the hexagonal crystal structure, magnesium alloys cannot be drawn cold, therefore temporary tools cannot be used at such temperatures of 400-650° F. Easiest draws to make are straight-sided rectangular box-type draws and cylinders.

NEW REAMER ROLLING PROCEDURE—In Dearborn, Mich., U. S. Tool & Mfg. Co. is using an entirely new procedure for making standard and special high-speed reamers, where the cutter blades of high speed steel are firmly anchored in recesses of a tool body of low carbon steel. The rolling process involves no application of heat as in welding or brazing, and worn and undersized reamers can be rerolled at the factory several times to restore original diameters to precision limits.

POSSIBLE "PATH FINDER"—X-ray studies of lithium transformation show many similarities to transformations in steel and suggest some new principles that may hold for all similar transformation, Dr. Charles S. Barrett of the University of Chicago, pointed out recently to the Purdue chapter of ASM. In describing the fundamental research now being conducted at the school by a newly formed group for studying metals, he said lithium is an ideal material for such studies as it can be annealed by merely pressing between the thumb and forefinger, and hot worked by bending back and forth in the hand.

LARGER CYCLOTRON REQUIRES LESS STEEL— Plans to increase size of the Carnegie Tech cyclotron materialized just in time to stop pouring operations on the smaller 130-inch magnet at the Homestead Works of Carnegie-Illinois Steel Corp., Pittsburgh. The huge electromagnet, major unit of the atom-smasher, now is to have 145-inch diameter poles. Weight of steel in the magnet, including the poles and forgings that form its framework, will be increased from 1061 to 1465 tons. Copper coils 20-feet in diameter encased in stainless steel and weighing 87 tons each are to surround the top and bottom of the poles. Although this electromagnet is to produce as much energy as magnets in other atom smashers now nearing completion, it will require only three quarters of the steel.

"SUBMARINE" QUENCHING — Almost perfectly matched sets of automobile springs are turned out at a high production rate with a unique forming and quenching technique using a machine called a "submarine", specially designed for the work by U. S. Spring & Bumper Co. In quenching the springs, each leaf is withdrawn from a high heat furnace, is then placed on the "submarine" which looks like the paddle wheel of a stern wheel steamer. As each hot leaf is placed on one of the paddles, the work is automatically clamped to a form and immediately quenched during a revolution of the machine through the oil. (p. 92)

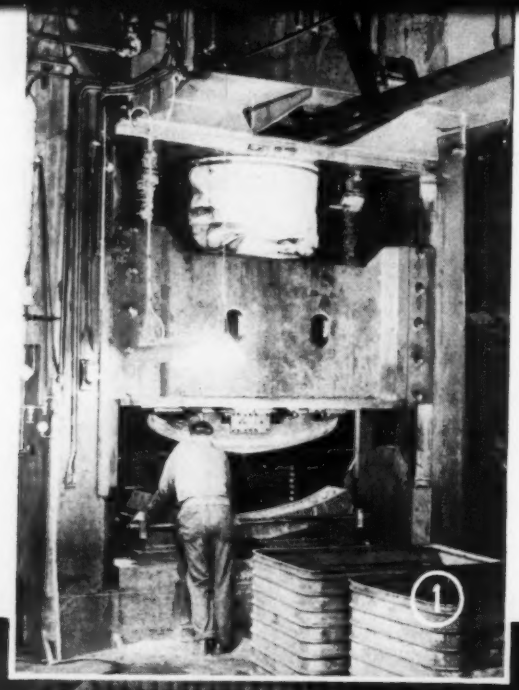
CUTS SPRUE ASSEMBLY — One machine used at Allis-Chalmers in connection with wax injection dies is designed for high production work, and almost is entirely automatic in its operation. Dies are especially designed to fit the machine, and where possible are multicavity—with cavities joined as required for casting—to reduce sprue assembly time. Cycle time of the unit varies from 2 to 3 minutes, depending on type of wax used, and volume of latter that must be chilled by water-cooled dies. (p.96)

WAR-NURTURED TECHNIQUE — Nearly all progress made by the forging industry was due to war requirements. In ancient days, there were swords and armor; after gun powder came into use, guns and rifles were made as forgings; and our own civil war plus the great world conflicts gave added impetus to the drop forging industry. First peacetime impetus was provided by the automotive industry. As the auto industry grew —so did the need of forgings increase. The push was still furthered by the aircraft industry until today applications for forged parts reach into all parts of the metalworking field. (p.100)

EXPENSIVE CUSTOM — When selecting metals for coke plants, the first consideration, it is pointed out, must be a correlation of the physical requirements demanded with the properties available in the metal. After determining these requirements and properties, these and only these must be indicated in the purchase specification. Addition of other qualifications just for the sake of specification, because of custom or habit is useless, time consuming and expensive. (p.111)

"SUBMARINE" Quench Technique

Employed in Forming and Hardening Auto Leaf Springs



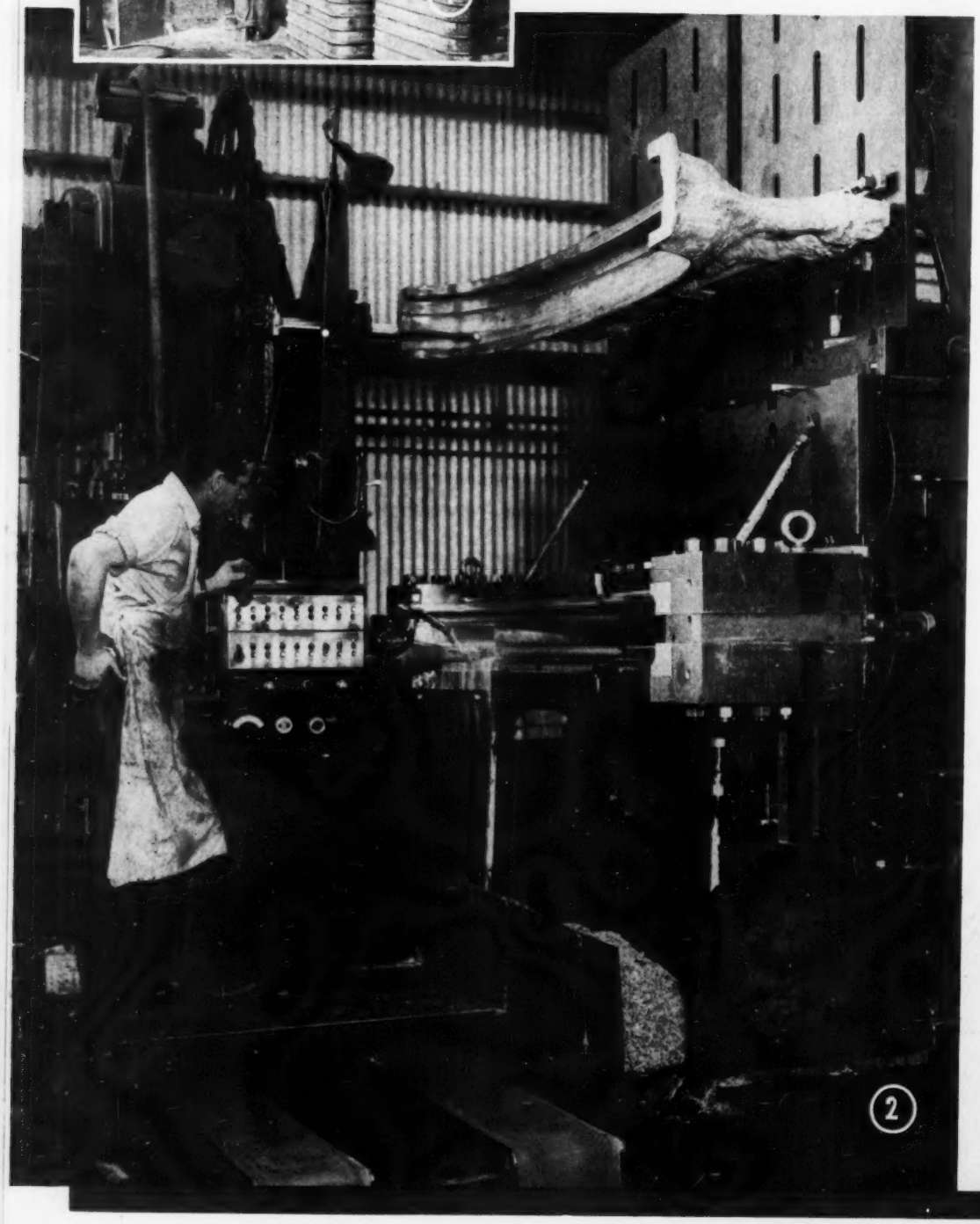


Fig. 1—Automotive bumpers being formed in a 1250-ton hydraulic press. Largest press used in plant is rated at 1700 tons

Fig. 2—Keller duplicating machine shown is one of three used to machine bumper dies

Fig. 3 — Automatic lines are used for polishing automobile bumpers. Capacity of polishing and buffing equipment is 5000 bumpers per day

Work is clamped to forming die on each of nine stations or "paddles" of wheel-shaped revolving unit and immediately quenched before tempering. Modified version of single-operation process also used for bumper treatment

By GERALD ELDRIDGE STEDMAN

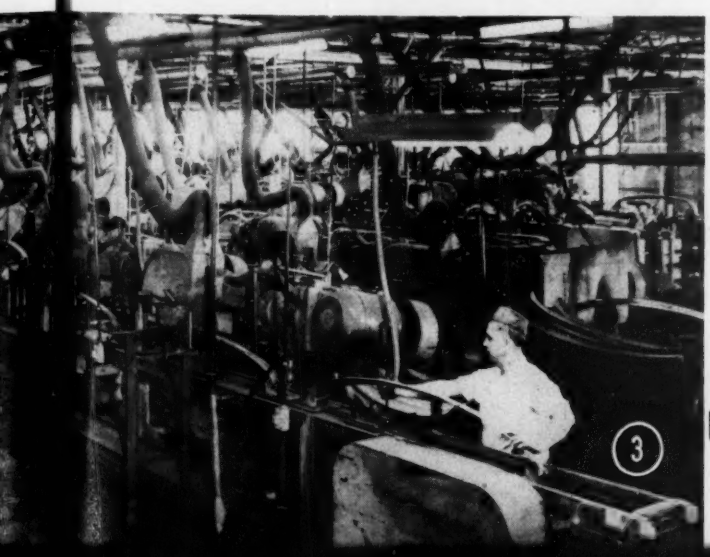
ALMOST perfectly matched sets of automobile springs are possible at a high production rate with an unusual forming and quenching technique utilizing a machine called a "submarine" which was specially designed and built by U. S. Spring & Bumper Co., for use in its Vernon, Calif. plant. A large portion of springs and bumpers used in passenger cars assembled on the Pacific coast are made by the company. All blanking and forming dies used in production are made in the company's machine shop which includes three Pratt & Whitney Keller duplicating machines one of which is shown in Fig. 2, machining a bumper die.

Hot rolled bars and strip are largely supplied from west coast sources with the Kaiser mill at Fontana being one of the major suppliers. Automotive leaf spring bar size is 1¾ to 6 inches wide and 0.132 to 1.25 inches thick. Bumper strip range is 4 to 9 inches wide and 0.10 to 0.25-inch thick. This stock is usually in A-5150, A-4068, A-6152, C-1085, C-1080 and C-1010 (minor) steels.

Cold Shearing—Hot rolled bars for spring leaves are first sheared cold on a 150 ton mechanical press which operates at 50 strokes per minute. Tooling is arranged to punch center bolt holes, shear to length and trim the point of each leaf (diamond or spear) in one press stroke. Varied leaves comprising a given spring which average 10 in number are formed in a given order at one time and kept as a set in the production flow.

Some leaves require a taper from 3 to 5½-inches long on each end in accordance with customer specifications. This work is accomplished by drawing in an eccentric roll. Main leaves may have eyes forged in each end on machines made for this purpose.

After initial forging, leaves are placed on skids and arranged at the conveyor station in front of high heat furnace. They are then matched in sets and placed on the continuous alloy conveyors for passage through high heat furnaces preparatory to hot forming. Each gas-fired furnace is 35 feet long, has a capacity of 8000 pounds per hour and is pyrometrically controlled in three zones to 1500-1600° F with a 15 minute preheat zone and a 30 minute soak. Total furnace production is approximately 6000 springs per day.



Spring Forming and Hardening—Each leaf is withdrawn individually from a gas-curtained side port of the high heat furnaces by an operator with tongs, and is then placed on the "submarine" which looks like the paddle wheel of a stern wheel steamboat. Each machine operates in a 3000 gallon quench tank of motor-agitated, recirculated cooled oil. The paddle wheel of the "submarine" has six to nine blades or stations, each carrying a stationary forming die to accommodate the particular leaf of the psring set. Operator places the hot leaf on this form where it is automatically clamped and immediately quenched in the revolution of the submarine through the oil. Six to nine form and quench operations are performed per revolution. In this manner each leaf of the series is formed or cambered to the proper shape and hardened in oil quench.

As the machine revolves, bringing each station out of quench, work is lifted off by tongs and loaded individually on to the continuous conveyor of a 30-foot tempering furnace, operating at 800-900° F temperatures and pyrometrically controlled to obtain exact hardness limits necessary for long service life. As work comes from this furnace, it must brinell about 400. An instrument man from Brooker's laboratories and the foreman spot check the brinell operator.

When heat treat is completed, matched sets of spring leaves go to assembly. In some instances, customers require shot peening and this is accomplished on an automatic Pangborn shot peener using No. P 23 shot.

Leaves are greased, assembled and bolted. Those leaves requiring clips are so prepared. Bushings are reamed to size and inserted in spring eyes where specified and clips are crimped over. Center and clip bolts are taken up and the springs are given a bulldozing test on a specially designed load testing machine. Clips and covers are then installed and springs are ready for shipment.

Bumper Steels—Present day bumpers are made from either a carbon spring steel or a low carbon, low alloy, high strength steel suitable to cold forming. The latter is annealed, pickled to remove scale and oiled to prevent rusting at the mill. Either type starts as a strip and enters cold blanking presses to receive necessary contouring and profile.

Bumper assembly consists of: Bumper, arms and back bars. Production flow on the bumper is cold blank and punch, hot form, draw, pickle and plate. Sequence on arms and back bars is cold shear, hot form, hot punch and oil quench, draw, pickle, bonderize and enamel.

Some bumpers are hot formed, others cold pressed.

The company expects to greatly increase its cold forming operations in 1948.

Cold formed bumpers are pressed to shape in large mechanical presses, largest of which is a 1700 ton Clearing. Though forming dies are often large, they are not particularly unusual. Other bumpers, after blanking, are heated in special furnaces with controlled atmosphere to reduce scaling, and are then hot formed over form dies in hydraulic and mechanical presses. This forming technique makes use of a walking beam continuous Surface Combustion DX atmosphered furnace, 1500-1600° F, which establishes low grade protective atmosphere which neither adds to nor detracts from the mill scale as received. From this furnace the work is placed in the press in cherry red condition and formed between steel dies. A continuous flat conveyor then takes the work through a gas fired tempering furnace.

Simpler shapes of hot formed bumpers are brought into shape in a machine designed by the company which forms and quenches, following which the steel is tempered to desired brinell for spring characteristics in a process similar to the submarine technique used in hot forming springs. Some of the hot formed bumpers are transferred from forming press to oil for hardening, but the more complicated types cannot be oil hardened without serious warping.

Centralized Pyrometric Control—After tempering constant check is made to assure correct hardness. Bumpers from hot forming go through conveyorized pickling tanks to remove scale. Cold forming does not require this as no scale is involved. An interesting factor of plant layout is the completely centralized pyrometric control so that all furnace temperatures are read from one island control room. There is excellent straight-line flow in the sequence of the cold-formed bumper line with work moving to polishing batteries.

After forming, bumpers are toted in skids by lift trucks to the polishing department. An automatic end polishing machine which has a continuous rectangular conveyor carries the bumper bars through 20 polishing heads. Work then comes to station in front of the loading zone of six automatic polishing lines, Fig. 3, each 130 feet long.

Work moves by conveyor straight through polishing in special holding fixtures. Each station is equipped with special rigging and varied polishing wheels with adjustable heads. A variety of grits is used on the wheels, each of which covers a certain portion of the bumper surface. The machine operator controls the polishing by his predetermination of pressures. An elaborate vacuum system takes the grinding dust away from each station.

Bumper Plating—After polishing, the bumpers are hung on rubber covered carrier racks, and are conveyed through the complete nickel plating process without removal. They are given a thin electroplate of copper and then a nickel plate. Next, the work is buffed by machine or hand to effect a bright luster and is then chrome plated. Complete chemical and physical tests and controls are established in all phases of the plating technique.

There are three plating lines, two with ten tanks and one with eleven. Tank sizes are 8 feet 6 inches long, 6 feet wide and 7 feet deep and are served by overhead monorail. The first line cleans and copper plates, the others handle nickel plating, acid dip and rinse. Lines are electrically timed, automatically controlled.

Proper plating agitation is provided for the plating solution by a motor drive which gives a 5 inch oscillation to the continuous beam at side of nickel tanks, Fig. 4. Average nickel plating cycle is 60 minutes. After nickel plating, the work goes to a final nickel buffing line which uses 10 heads and then to hand buffing jacks for hand coloring. Bumpers are then inspected, placed on plating racks and moved into final chrome plating. Upon removal from plating solution the bumpers are inspected and moved to final storage.

All bumper arms and back bars are carried by continuous conveyor through the spray bonderite unit, black enamel dip tank, a 65 foot drying oven which is kept at 300° F and from one building to another through a tunnel. This single conveyor is over 1300 feet long, travels 4 feet per minute and has a capacity of 960 parts per hour. Return line carries the conveyor hooks through a series of gas burners which burn off the excess enamel.

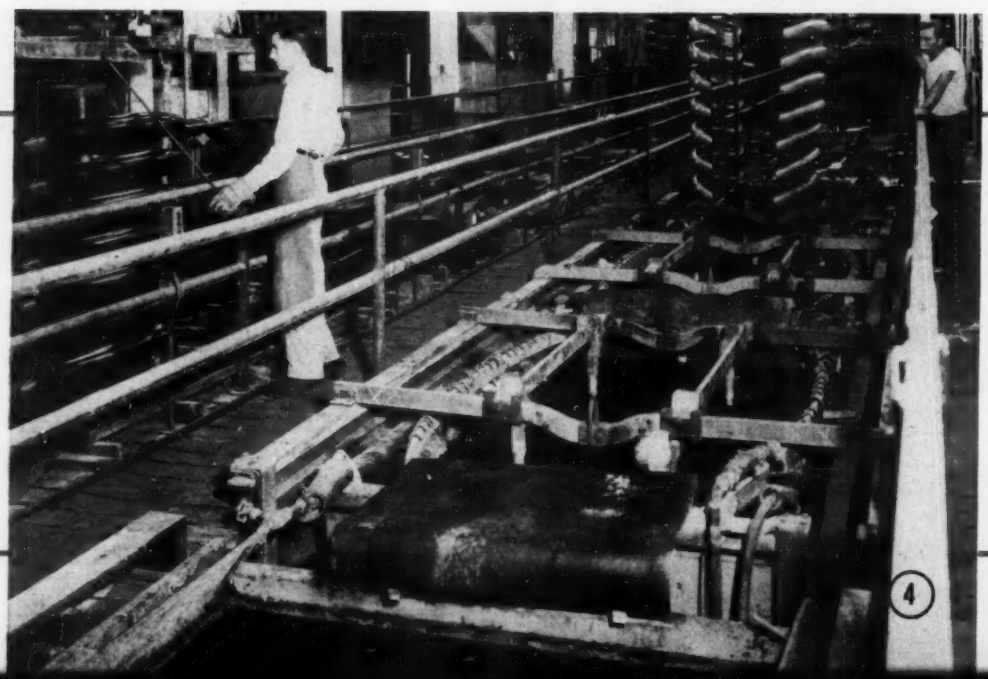


Fig. 4—Closeup showing bumper plating racks. Oscillator provides agitation for plating solution

Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

STORY OF E. W. BLISS: One of the valued "dividends" which I drew from E. W. Bliss Co. when I attended the open house at the Toledo plants on May 28, was a presentation copy of a new book entitled "The Third Dimension of Invention."

This profusely illustrated book (which incidentally is for special presentation and not for general distribution) carries the story of "three-dimensional" metal stamping and forming from the time of the birth of Eliphalet Williams Bliss (1836-1903) down to the present day.

E. W. Bliss got into the press business as a contract manufacturer of Fowler punch presses in the plant of Meridan Machine Co., Meridan, Conn., in 1857. Following active service in the Civil War, he worked at building printing presses in Brooklyn, N. Y. Then—inspired by his wife—he got back again to metal stamping machines, in a 20 by 40 foot loft shop in Brooklyn. Following several changes in name, this growing enterprise became E. W. Bliss Co. in 1886.

To my way of thinking, this book—by detailing step-by-step the tremendous strides made in pressed metal methods over a period of about a century—will do a great deal toward "balancing" executive thinking in regard to the relative merits of various methods of manufacturing metal products. Obviously, plastic working of metals now has achieved a place in the sun which no longer can be ignored or underestimated. Fred Wittner and the Bliss organization have done a valuable and highly interesting piece of work in "The Third Dimension of Invention."

QUICK TUBE CUTTING: Once in a while I get the idea that I have seen and heard about everything in the machinery field. Thus far I have been fortunate in having someone jar me out of that condition of dangerous complacency before it becomes too dangerous. Here is a good example.

Almost a year ago, as a preliminary to the big machine tool show, I wrote an article on cutting off techniques. I thought that I had touched upon everything in that field—until I received a telephone call a few days ago from Gerald A. Sheibley, sales manager, Grieder Machine Tool & Die Co., Bowling Green, Ohio.

He told me that if I would come down to Bowling Green, he would show me how to cut tubing of any commercial diameter up to 4 inches and of any ordinary wall thickness at speeds up to 12,000 cuts per hour, all this without distortion, with little or no burr, narrow kerf and to extremely close limits as to length. I went to Bowling Green a skeptic—but came away convinced that there is something new in machine shop practice as far as tube cutting is concerned and that this Grieder method is it.

Several years ago, Fred Grieder, skilled tool maker and inventor who is president of the company, got to dwelling upon the fact that tube cutting was a bottleneck in many manufacturing businesses—including his own mass production of children's tricycles. Breaking away from traditional revolving tool, revolving work, sawing and shearing methods, he began to experiment with special tools in punch presses.

What eventually grew out of this was a unique fixture in which the tube is firmly clamped by half-round jaws (or of other shapes in the case of square, hex, etc.), opened by a quick pass of a shaper-type blade across the top, then severed by a quick downward "stab" of a thin, spear-shaped tool the point of which enters the slot cut by the shaper blade. The tube doesn't revolve, it simply is fed longitudinally against a stop in time with the cutting operations. It is true cutting—not shearing—but the chip width is surprisingly small.

Having proved this unique method by means of this punch press attachment, several of which are now in use throughout the country, Mr. Grieder and his associates next undertook to "build a machine around the attachment" to attain maximum speed, size range and operational convenience.

The first model still retained some punch press characteristics, but the model now ready for distribution has broken away entirely from punch press heredity and is designed all the way through in the best interests of feeding in and gaging, cutting off and ejecting tubing.

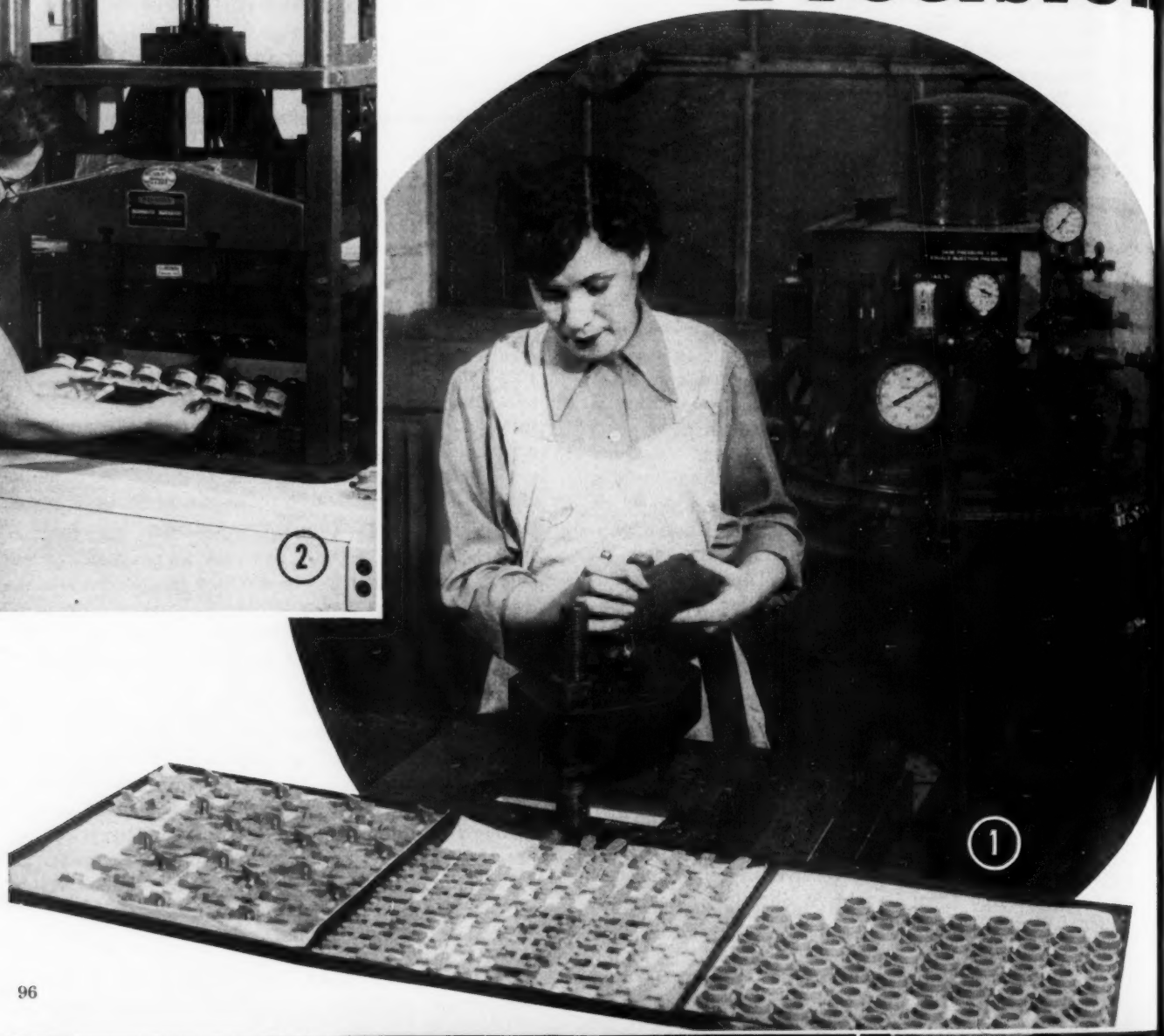
It represents an extremely interesting example of what a skilled tool engineer can do in the field of production metalworking machinery design, when he breaks with tradition, allows his imagination to run off in an entirely new direction, and then follows through with tooling and construction practical under the high pressure operations met with under today's competitive conditions. As one who knows, let me tell you that 12,000 cuts per hour can well be described as "machine gun action."

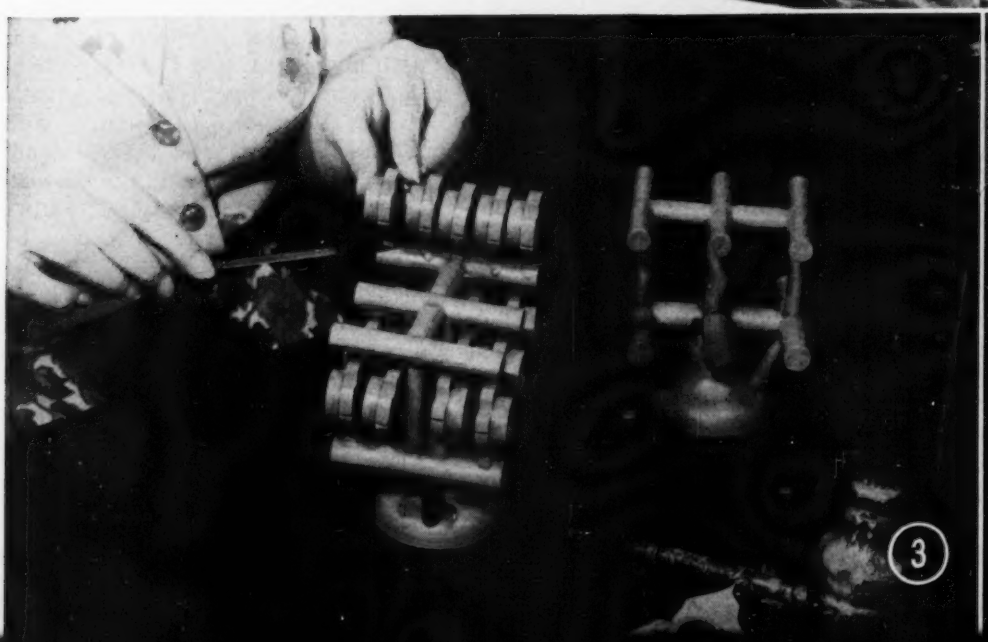
DOWN BY THE SEA: During the week of May 16 there came a welcome change in my usual routine. This was in the shape of some cruising, clam digging and shipyard visiting in Casco Bay and along the Kennebec River with my good friend Henry P. Chaplin, treasurer and general manager, Cone Automatic Machine Co., Windsor, Vermont. In common with Howard Dunbar, Russel Fellows and several other machine tool men, Mr. Chaplin knows all the ins-and-outs of the stern and rockbound coast of Maine, where tides run high and weather is in a class by itself.

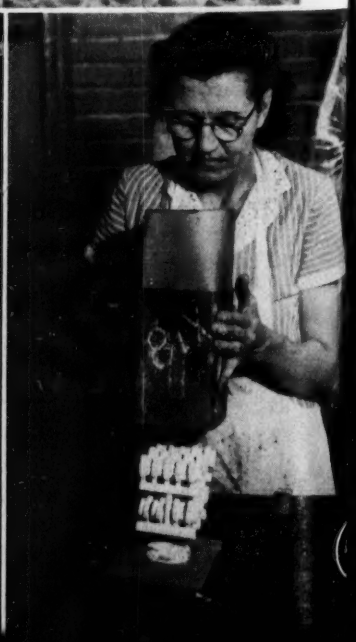
Rugged individualists "down east" in Maine remain unimpressed by the antiquity of Plymouth, Mass. They have strong reason to believe that Viking ships visited Casco Bay nearly 1000 years ago. They have positive proof that Popham at the mouth of the Kennebec was founded in 1607 and that a sort of "Marshall Plan" organized by its early settlers helped to keep the Pilgrims from starving to death in 1620-21.

Simplified methods and improved equ

Precision I







By K. J. YONKER
Application Engineer
Allis-Chalmer Mfg. Co.
Milwaukee

on Investment Casting

PRECISION investment casting is a somewhat involved process as compared to other foundry methods. From injection of the wax pattern to the inspection of the cleaned casting, about fifteen separate operations are performed over a period of 3 or 4 days. The story of improvement of the process since Allis-Chalmers made its first castings in 1943 has been one of simplification of methods and improvement of equipment.

Until recently, wax injection dies were all made of a low melting point tin-bismuth alloy cast around a brass or steel pattern. The soft metal was cast within a cast iron flask which became part of the die and gave the alloy good backing. However, with extended use the soft metal tended to flow and change shape, and pins or loose pieces within the die would lose their accurate fit. As a result, machined steel dies are now used almost exclusively except in rare cases where their greater cost is an important factor.

Extensive development work on wax injection methods has resulted in placing in operation two improved types of injection machines. One employs a Zerk fitting on the die through which the wax is introduced. Wax is pumped under high pressure from a central wax storage container to the injection nozzle through flexible hoses. The tank, pump and hoses are surrounded by water jackets in which water is circulated at thermostatically-controlled temperature to insure wax at the nozzle being at the correct injection temperature. The machine is most economical for small quantities of patterns since dies may be changed with ease and dies of almost any size or shape can be accommodated with little or no adjustment of the air clamp required.

The second injection machine is designed for high production work and is almost entirely automatic in its operation. Dies are especially designed to fit the machine, and where possible are multicavity, with cavities joined as required for casting, to reduce sprue assembly time. Cycle time varies from 2 to 3 minutes, depending on the type of wax used and the volume of wax which the water-cooled dies must chill. The only manual operations, except for pushing a button to start the cycle, are die lubrication and removal of completed patterns.

Castings up to 15 pounds total weight have been

Fig. 1—Injection molding wax patterns with an Allis-Chalmers developed wax injection machine. Dies are clamped in an air-operated press controlled by foot pedal. Wax is pumped under high pressure and thermostatically controlled temperature to dies through flexible waterjacketed hoses

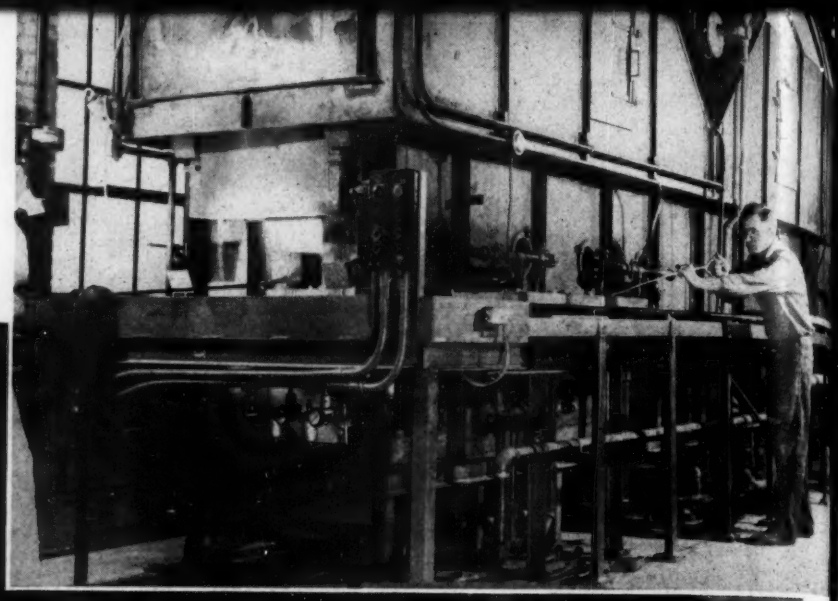
Fig. 2—Removing completed patterns from an automatic wax injection machine. This unit produces patterns automatically in 2 to 3-minute cycles, with pattern removal and die lubrication the only manual operations

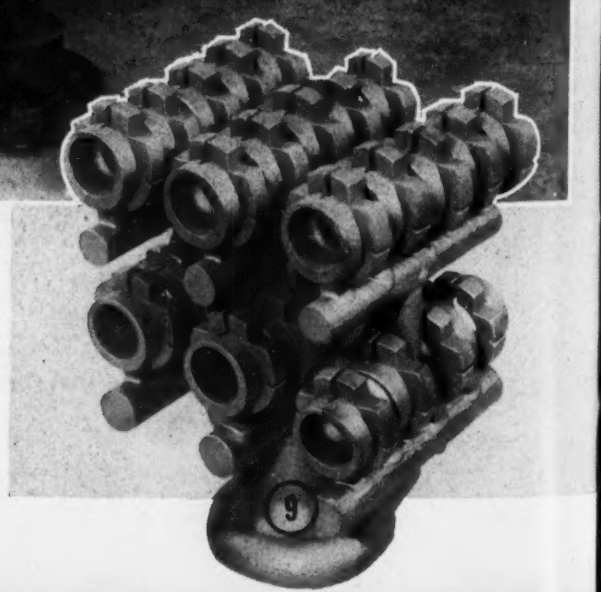
Fig. 3—Welding completed patterns to specially-designed sprue structure with heated tools. Sprues are designed to support patterns in flask, to leave passages for proper distribution of metal during casting, and to permit assembly of part to get maximum number of patterns in one flask

Fig. 4—Pattern group is attached to a bottom plate with hot wax. A stainless steel flask lined with waterproof paper is placed over patterns and sealed with wax. Prior to this operation, primary investment dip coat is applied. A mixture of fine silica and sodium silicate, this coating forms inner surface of mold after wax is melted out. While the primary investment is still moist, slightly coarser silica is sifted onto pattern group. This gives coating strength and provides a rough surface for adherence of the secondary investment

Fig. 5—After filling, the flasks are agitated on this vibrating table to pack investments firmly and to fill intricacies of wax patterns. Molds remain on vibrating table until investment sets. This takes 30 to 45 minutes. Next excess liquid is decanted from mold and excess paper is cut from top of flask. After minimum setting period of 10 hours, bottom board is removed from flask and mold is set sprue end down over a hole in the steam table. Over a period of about 2 hours the wax runs from mold into steam chamber where it is collected for reuse

Progress of PRECISION INVESTMENT CASTING





made at Allis-Chalmers. To obtain parts of this size free of surface defects it has been necessary to carry out constant experimental work with primary and secondary investment materials and methods of application. On large parts, often two or three dip coats of primary investment are applied.

Induction furnaces, 9600 cycle, are used to melt metal for casting in this foundry. Each heat is about 35 pounds, enabling pouring of as many as four or five molds from a single charge. These relatively large melts permit much more accurate metallurgical control than was possible when the small melts required by pressure casting apparatus were used. Proper gating is the key to sound castings, and it has been found possible to cast almost any size and shape by standard gravity head pouring, without recourse to complicated mechanical aids like centrifugal or pressure casting machines. In rare cases where extremely thin sections are encountered, vacuum pouring has been used. Any type of castable metal, from gray iron and low-carbon SAE steels to special high-temperature alloys, can be poured.

In general, precision investment casting is finding more application on larger parts, and castings up to 10 pounds and 10 inches are common. New techniques are being developed to handle larger castings. No great strides have been made in obtaining closer dimensional tolerances, but it has been possible to get more uniform dimensions from one casting to another and thus reduce scrap. Costs are being lowered by mechanization, reduction in scrap, and new techniques. These developments have resulted in wider application of the process and a more general understanding of what the process can do.

Fig. 6—Molds, sprue end down, are placed in this pusher-type furnace and increased in temperature from 200 to 1850° F over a period of about 8 hours. Any wax remaining in the mold cavity is volatilized in this furnace while mold is being cured. Metal is melted in two 30 kilovolt-ampere, 9600-cycle induction furnaces each of 35 pound capacity. Relatively large melts promote more accurate metallurgical control

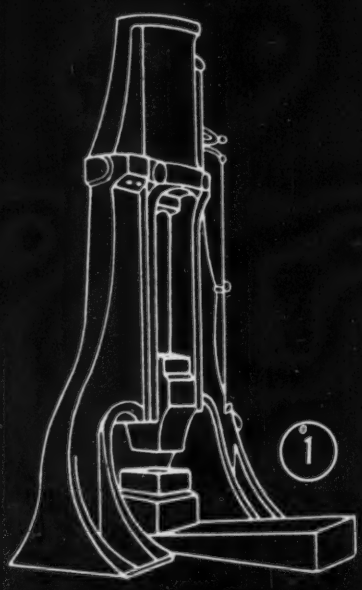
Fig. 7—Hot flasks are placed on sand-covered table which can be turned by hand for convenience of pouring crew. Molten metal is transferred to molds by ladle; standard gravity head pouring is used in almost all cases. Normally, metal is poured into molds while hot. Casting assembly is knocked out of the flask with an air hammer. Flask is held firmly by air-operated clamp while vibration quickly crumbles the friable investment

Fig. 8—Individual castings are cut from the sprue with a special high speed band saw. Some harder-to-machine alloys are cut with circular friction saw. Last traces of investment are removed from castings by sand blasting

Fig. 9—This sprue of castings has had most of the investment removed in a Wheelabrator and is now ready to have individual castings cut from it

Fig. 10—Group of miscellaneous parts cast at Allis-Chalmers

With this article, STEEL begins a new series describing how metals are formed by hammering and squeezing. Succeeding chapters will deal with practical as well as theoretical aspects of these important metalworking techniques. Subjects to be discussed will include equipment, dies and tools, shop operations, inspection, forging metals, design



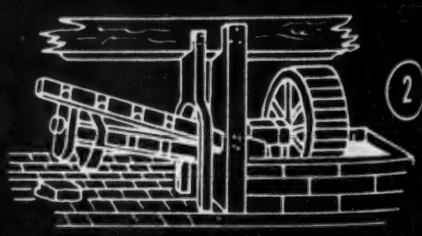


Fig. 1—Early water power hammer

Fig. 2—Early steam cam hammer

Fig. 3 — Naysmith's steam hammer

By WALDEMAR NAUJOKS

FUNDAMENTALS OF Forging Practice

From Tubal-Cain and his crude forging tools, up through James Naysmith's invention of the first successful steam hammer, to the development of the modern 20,000-ton hammer, the author traces the history of a large and powerful segment of the metalworking industry

NEARLY everyone who is interested in mechanical things and in the working or assembling of metal parts, has some ideas on the forging of metal. There is something fascinating to anyone watching the hot metal being hammered in shape from a round or square bar, with the hot sparks flying and the general atmosphere of the forge. This is true whether the forge is a small smithy in the country, doing repair work, or whether it is a large commercial production forging plant, making forgings by the thousands.

Members of the older generation remember the blacksmith shops where wagons were repaired, horses shod, and chisels dressed. Some of the blacksmith equipment such as the anvil, hand sledge, and the helper's two-handed sledge, have been used for thousands of years in making various implements for mankind.

The art of forging came into existence thousands of years ago. It has always held an important position in human history. Much of the story of the progress of forging has been lost or clouded because of the lack of good records.

It is difficult to know just when the change was made from the stone age to the metal age. Some parts of the ancient world, such as Africa, seem to have changed from the stone age directly to the iron age. The transition depended probably upon the kinds of metals that were available at the time the usefulness of metals was discovered.

It is fairly certain that changes from the stone age to the bronze age and then to the iron age were fairly gradual, taking place perhaps over a period covering hundreds of years. The Bible mentions Tubal-Cain as an instructor in the forging of brass and iron. Most historians seem to agree that the use of iron was made some time prior to 1000 B. C. and that the bronze age preceded the iron age by hundreds of years.

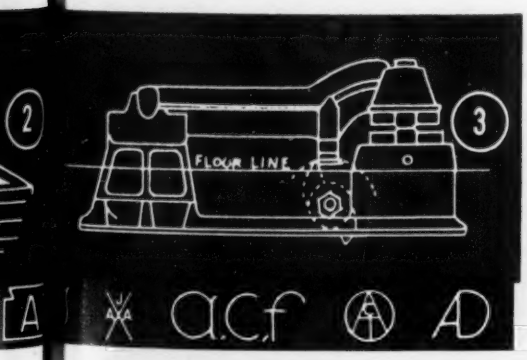
Ancient Tools Similar to Blacksmith's—It is known from early records and inscriptions and from the ancient tools that have been uncovered, the ancient smith worked with tools very similar to those used in the present day blacksmith shop where hand forging is done. Anvil, hand tongs, hand hammer, and the forge indicate very little change. The ancient smith made his own iron and steel, melting iron ore and working out the impurities, adding carbon to give the metal the ability to be hardened by quenching in some liquid, and shaping the metal by forging it on the anvil. The early smith used his time, for the most part, in making weapons of war. Swords, spears, pikes, and armor were some of the products of his skill.

Ancient forges were located in caves or near the side of a hill so as to obtain natural draft for the forge fires of sufficient intensity to heat the metal to a white heat. Such a natural draft is similar to the draft obtained in a high chimney. By the time of the Christian era, the use of iron and steel was recognized for edged tools, swords and other cutting implements. Wood was used as fuel, and coal did not come into use until hundreds of years later.

Quality of the steel depended upon the quality of the native ore and to some degree upon the skill of the smith. Naturally, the quality varied considerably with the location of the forge. The early era also indicates the use of crude bellows to provide air for the forge fire, hand operated at first, and operated by foot at a later date.

Early smiths were sort of serfs or slaves of a lord who owned them and directed their activities. While most of their time was spent making weapons of war, there were times when they were given the task of making some special project, such as a hand forged fence, or some other ornamental object. Some of these projects took hundreds of smiths many years to complete.

As time passed, it became recognized that success in battle depended to a large degree upon the quality of weapons provided. This led to raising the status of the smith from serfdom until he became the most honored of the craftsmen, or guilds as they were called. William the Conqueror was one of the successful leaders to recognize the value of good weapons in



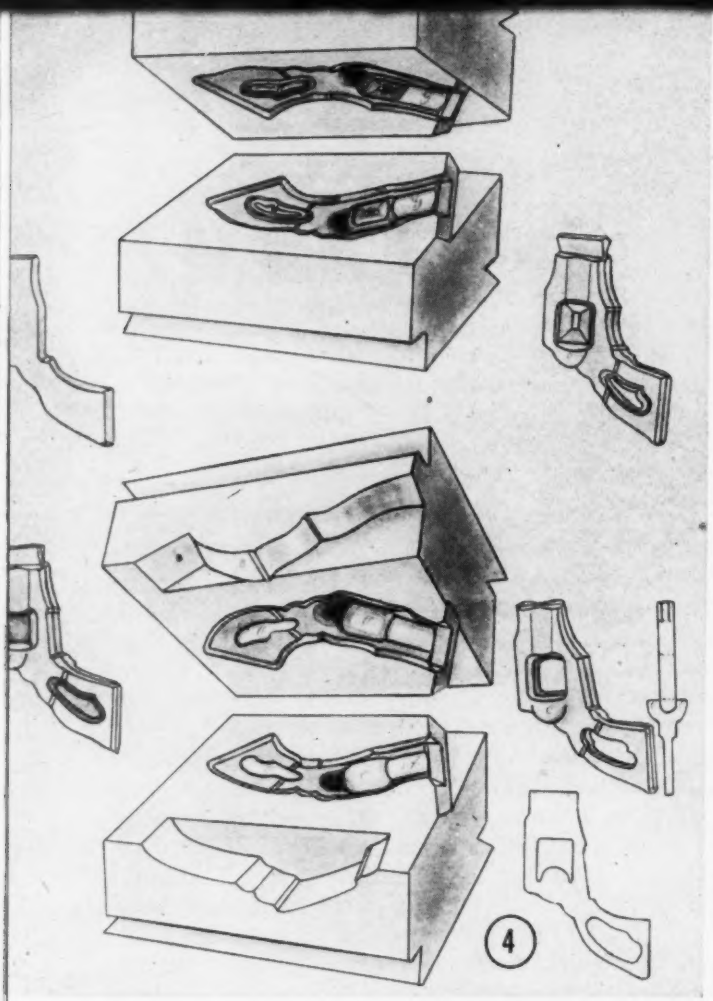


Fig. 4—One of the earliest sets of drop forge dies. Courtesy Billings & Spencer Co.

waging winning warfare and he acclaimed the craftsmen who supplied his armies with good weapons.

The forging craft was a closed craft, with the secrets of the trade passing from father to the oldest son, or if there were no sons, to the nearest male relative. It is natural that the limitations imposed tended to retard improvements or the development of new ideas. For hundreds of years the progress in the forging art was slow. There were individuals trying to improve the quality of the steels and the hardness, with most of the attempts being experiments with various liquids in which to quench steel for the hardening operation.

Early Heat Treatments—It is reported that the best Damascus swords were heat treated by heating them to the color of the full moon and then plunging the red hot metal into the thigh of a slave where his blood would cool and harden the blade properly. Apparently, experience taught the ancient smiths that the color of the full moon was just the right temperature for hardening by quenching. It was the only temperature indicator available, so they had to wait for the full moon to do their hardening and tempering.

Water alone was not a desirable quenching medium for the ancient smiths. Each one had his own secret formula which might be a special brine, goat's blood, particularly from young kids, urine from animals and human beings (there appeared to be a preference for urine from red-headed boys), horse radish juice, and many other types of liquids. The use of such special quenching media continued up to about 30 or 40 years ago. It is within the past quarter century that a more accurate knowledge of the effects of various quenching media has become known to the heat treater.

Water-Power Forging Hammer—Up to about the thirteenth or fourteenth centuries A. D. all of the forging work was done by hand, with the smith using a hand hammer to direct the blows of his helpers who wielded sledges. The water-power forging hammer was developed along about the middle ages. It was designed to simulate the action of the hand sledge, with a large striking weight at one end of a long heavy handle, called the helve. A steel pin through the helve gave a rocking or striking action to the power hammer.

A rotating water wheel was connected to a cam, which raised the helve and permitted it to drop to strike the blow. Use of the water power forging hammer permitted the smith to make larger forgings than had been made previously. The water power hammer was used up to the beginning of the nineteenth century. Attempts had been made to use steam for operating power hammers during the 17th and 18th centuries but with little success. The first successful use of steam power to operate a forging hammer was made early in the 1800's, when a steam engine was used to rotate the lifting cam. This permitted the forges to be built away from water power streams.

Steam Forging Hammer—Credit for designing the first successful direct acting steam forging hammer is generally given to James Naysmith, a Scottish engineer. Completed in 1838, the design was for a larger forging hammer than existed at the time. The first hammer was built by Frenchmen some years later. It was of the single acting type, with the steam cylinder on top of the hammer being used to raise the ram and die. The free fall of the ram and die provided the forging blow. Today, steam forging hammers and steam drop hammers are of the double acting type, where steam power is used to raise the weight of the ram and die on the up stroke, and then used to add to the forging pressure on the down stroke.

Up to about 1840 all forgings were made on flat dies. At that time, the idea of gouging out the top and bottom die was considered, so as to obtain a rough shape that was more nearly like finished part. That was the beginning of the impression dies which are used in the drop forging industry. Along about this same time several methods of raising the ram and letting it fall to strike a blow were being developed. Strap hammers, where a leather strap was rolled about a shaft to raise the weight, were tried. At the top of the stroke, a clutch would disengage and permit the weight to fall. Eventually, boards fastened to the top of the ram were used, with a pair of rolls pressing against the boards to roll up the weight. At the top of the stroke, the rolls would spread apart to permit the ram to drop.

Impression Dies—Samuel Colt is credited with being one of the first to use impression dies in the forg-

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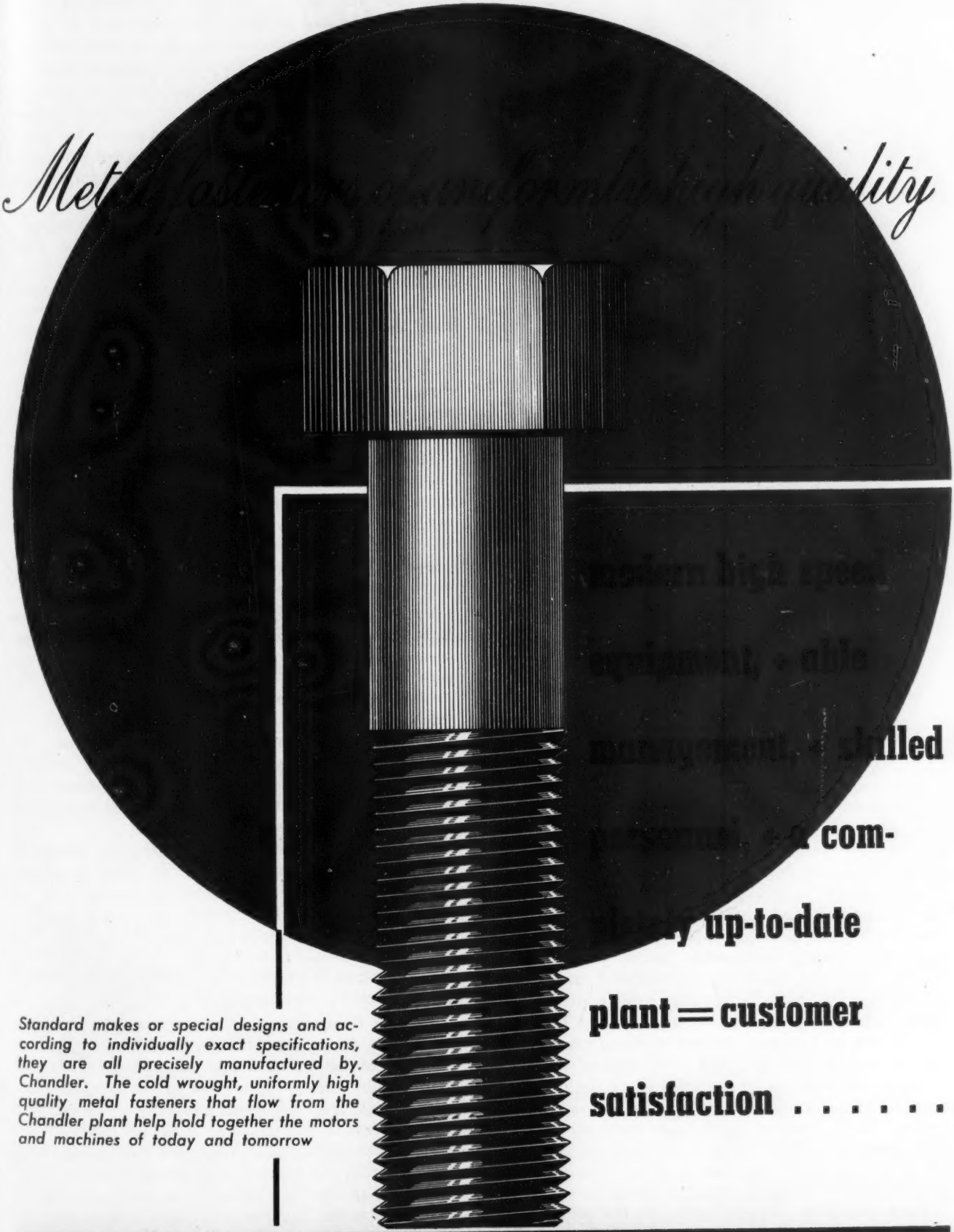

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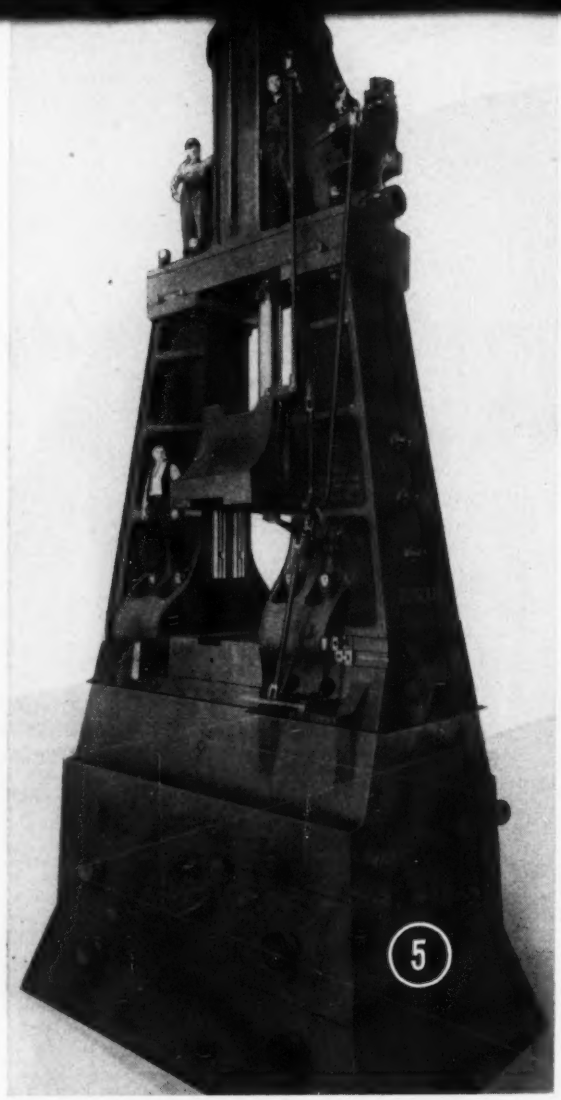

Fig. 5—Modern steam or air operated drop hammer, having falling weight of 50,000 pounds. Courtesy Erie Foundry Co., Erie, Pa.

ing hammer for commercial duplication of forged parts, in making revolver and gun parts. The Civil War from 1861 to 1865 gave impetus to revolver and gun production and this enabled improvements in the drop forging practice. After the end of the civil war, drop forging production turned to parts for sewing machines, bicycles, agricultural implement parts, machine tool parts, and similar production needs. Practically all of the drop forging industry was in the east during the end of the 19th century with the major portion in the New England states.

Up to the 20th century, nearly all of the progress made by the forging industry was due to war requirements. In the ancient days, there were the swords and armor; after gun powder came into use, guns and rifles were made as forgings; and our own civil war gave impetus to the drop forging industry.

First peacetime impetus given to the forging industry was the need for forgings for the automotive industry. From the birth of the automobile in the 90's, forgings were necessary for automotive parts. As the automotive industry grew, the need for drop forgings increased and today a major portion of production forgings is used for auto and truck parts. The aircraft industry developed planes for commercial use after the first world war, and today countless forgings are used in the aircraft industry. It is expected that the increased use of airplanes will increase the requirements for aircraft forged parts.

Forging machines, or upsetters are a development of the early bolt header. History of early bolt making is quite hazy and while records indicate that bolts have been in use for hundreds of years, not much else is known. It appears that they were hand forged and the threads were filed by hand.

About 1830 appears to be the first date to indicate the use of a machine for making bolt heads. This machine, known as the "English Oliver", was a hammer type bolt header where a hammer head dropped on the end of an iron rod to upset the head. Levers were connected to the striking helve so that both the machine operator and the helper jumped on the levers to add to the force of the blow. From 1830 on through the Civil War period many types of bolt headers were designed and built, with the present forging machine as a result.

Modern forging machines have a moving die which presses against a stationary die to grip round bar stock, and this is followed by the forward movement of the header slide to push the metal into a die cavity provided for it. From making bolt heads, the forging machine has developed into a forging tool that produces a wide variety of forged parts.

The forging press is a development of early presses that were used to make coins. The original coining presses were of the screw press type and at a later date the mechanical crank presses and the hydraulic presses were developed. Forging presses are now considered in two general classes, those used to make the smith type of forging, and those used to make impression die forgings. The smith type of forging press is generally of the hydraulic type. Presses used for impression die forgings may be either mechanical or hydraulic.

Range in size of work made by forging presses is very wide. Forgings as small as an ounce in weight are made in various shapes on a production basis in the forging press. From such small forgings, the forging press of the smith type produces forgings that weigh over 100 tons each, such as large shafts. Drop forgings range in weight from under 1 pound to about 2 tons each for the largest drop forgings.

Forging Compositions—Early forging compositions were quite limited in variety. Little was known of the use of alloys and it was not over 50 years ago that serious consideration was given to alloys, except where they occurred naturally. Present day range in metal compositions used for forgings includes ingot and wrought irons; low medium and high carbon steels, hundreds of different alloy steels, stainless irons and steels, heat resisting steels, tool steels, copper, brasses, bronzes and light alloys such as aluminum and magnesium alloys. Variety of industrial and commercial applications for forged parts reaches into all parts of the metalworking industry. Industrial applications include automobile and truck forgings, road machinery and ditch digger forgings, locomotive and railroad forgings, crane, hoist, and conveyor forgings, forgings (*Please turn to Page* 129)

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Twenty parts on every car produced! That's Bundyweld's average today—and here's why:

Bundyweld is double-walled from a single strip of metal.

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For fuel and brake lines in gasoline- or deisel-engined vehicles—for almost any functional use—Bundyweld is the industry's first choice. Find out why. Read, across the bottom of this page, how Bundyweld is made.

Then find your nearest Bundy distributor or representative among those listed below, and ask him for the full story on Bundyweld steel, Monel and nickel tubing. Or write directly to us: *Bundy Tubing Co., Detroit 14, Michigan.*

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WHY BUNDYWELD IS BETTER TUBING

1 Bundyweld Tubing, made by a patented process, is entirely different from any other tubing. It starts as a single strip of basic metal, coated with a bonding metal.

2 This strip is continuously rolled twice laterally into tubular form. Walls of uniform thickness and concentricity are assured by close-tolerance, cold-rolled strip.

3 Next, a heating process fuses bonding metal to basic metal. Cooled, the double walls have become a strong, ductile tube, free from scale, held to close dimensions.

4 Bundyweld comes in standard sizes, up to ⅝" O.D., in steel (copper or tin coated), Monel or nickel. For tubing of other sizes or metals, call or write Bundy.

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Bundyweld nickel and Monel tubing is sold by International Nickel Company distributors in all principal cities.

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Condensate To Trap or Water Outlet
For Rubber Lined Tanks Etc. Insulate Headers from Lining with Wood Block, Soap Bricks, Etc.
8" Max.
Liquid Level
4" Max.

STAINLESS STEEL FINISHING PROCEDURE

Described at Electroplaters' Meeting

Passivation, scale removal and pickling procedures are discussed at educational session. Periodic reverse current electroplating and power transmission and piping were subjects of other papers presented

STAINLESS steel surface finishing and new developments in plating were discussed at the annual regional meeting of American Electroplaters' Society held in Rochester, N. Y., April 24. Speakers at the meeting included K. M. Huston, national president of the society, Dr. D. Gardiner Foulke, and W. E. Stadel substituting for G. E. Nankervis.

Surface of stainless steels presents a unique phenomena in that it is normally a passive transparent film of a group of oxides which serves to retard corrosive action, stated K. M. Huston, Armco Research Laboratories, Baltimore. Since the film recurs when stripped off or penetrated, it serves to parallel stainless steels with the through-and-through noncorrodability of the noble metals such as gold, platinum and iridium.

It is quite possible, he continued, for a fabricator who is unfamiliar with proper finishing procedure for stainless steel to produce an article which will show superficial rust in a short time. Because of its importance, passivation should be considered in conjunction with each final finishing operation, whether it be scale removal, tumbling, polishing, pickling, grinding, sand blasting or any method which tends to remove the passive film. Removal of iron particles, embedded in the surface during fabrication is of particular importance in the nitric acid passivation treatment with reinforcement of oxide film being of less importance. Properly cleaned stainless surface rapidly becomes passive in air or other oxidizing environments.

Solutions for Passivation — Solutions recommended by Mr. Huston for passivation of stainless steel consist of 20 to 40 per cent (by weight) nitric acid at 120 to 140°F, for 15 to 30 minutes, used for ferritic or nonhardenable straight chromium grades and the austenitic or nonhardenable chromium-nickel grades; and an 18 to 22 per cent (by weight) solution of nitric acid, to which has been added 1½ to 2½ per cent sodium bichromate, used at 110 to 120°F for 15 to 30 minutes, for martensitic or hardenable straight chromium grades and for highly polished parts. Following passivation, parts would be rinsed thoroughly with cold water.

New scale formed on stainless is generally tenacious and may be more difficult to remove than scale on carbon steel. Two basic methods are used, mechanical, such as sandblasting and tumbling, or chemical, such as pickling in acid solutions or molten salt. If parts are to be placed in service with a mechanical finish, without polishing or buffing, they should be cleaned thoroughly by pickling

Fig. 1 (above)—Carbon construction plate type heat exchanger for use as a heater or cooler for pickling, etching, plating, cleaning or similar operations

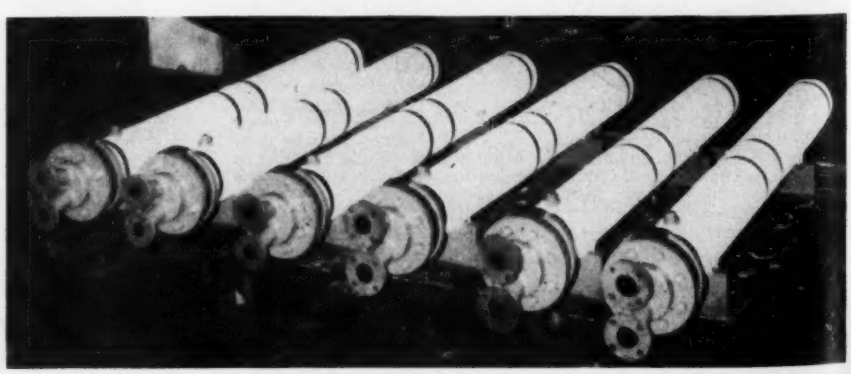

Fig. 2 (right)—Heat exchanger which is constructed of carbon material for use in bright nickel plating processes

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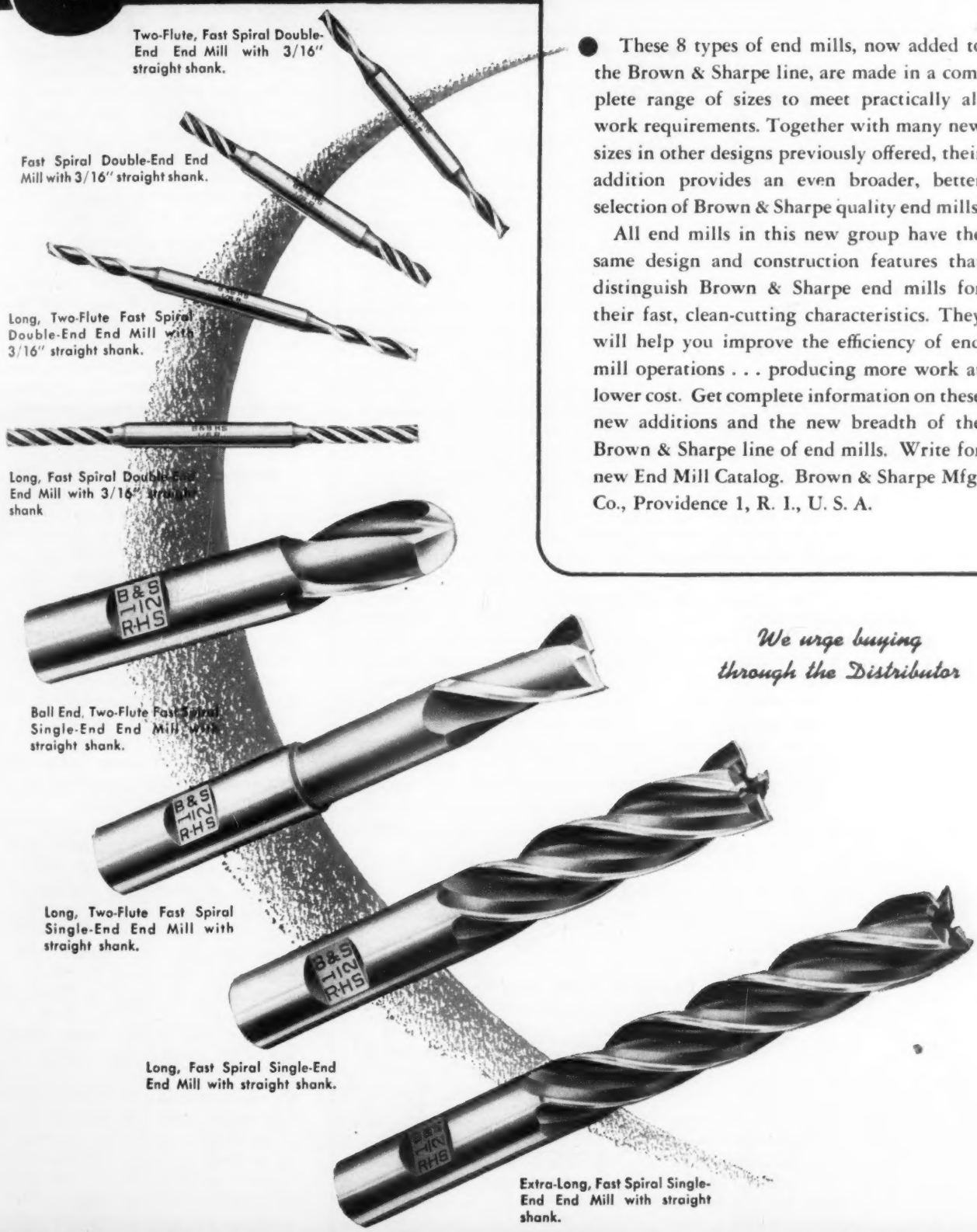
8



Two-Flute, Fast Spiral Double-End End Mill with 3/16" straight shank.

Fast Spiral Double-End End Mill with 3/16" straight shank.

Long, Two-Flute Fast Spiral Double-End End Mill with 3/16" straight shank.

Long, Fast Spiral Double-End End Mill with 3/16" straight shank

Ball End, Two-Flute Fast Spiral Single-End End Mill with straight shank.

Long, Two-Flute Fast Spiral Single-End End Mill with straight shank.

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and also by passivation.

Frequently it is practical and cost-saving to blast the scale on stainless steel parts which have been subjected to high temperatures in order to break up hard scale and render it more responsive to pickling operations. Air-driven and rotary impelled sand, stainless steel shot or aluminum oxide grit are used. Fragments, deburred particles or other fines must be avoided. Unevenness of surface to such a degree that it will interfere with subsequent grinding and polishing should be avoided.

Pickling Procedures—Scale formed on stainless steels during forging, heat treating, welding and other high temperature processing will vary greatly with the grade and the heat treating environment. Straight chromium grades are generally harder to pickle. One procedure, recommended by Mr. Huston for pickling, consists of two steps involving the use of sulphuric or hydrochloric acids, followed by immersion in a nitric-hydrofluoric acid solution. First step in the procedure employs 8 to 11 per cent sulphuric acid, at 150 to 160°F, for 10 to 45 minutes, or a 10 to 15 per cent solution of hydrochloric acid at 120 to 140°F for 30 to 90 minutes. Inhibitor may be used and parts should be thoroughly rinsed before proceeding to the second step. Second step consists of immersing the parts in a 6 to 8 per cent solution of nitric acid containing 1½ per cent hydrofluoric acid, at room temperature for 10 to 30 minutes, or until smut is removed.

When stainless steel stock has been purchased from the mill in a highly finished condition, it is frequently advisable to protect this finish during fabrication. It was pointed out by Mr. Huston that there are a number of products which have been found practical for this purpose. When the construction or fabrication is finished these materials can be readily removed.

Grinding, Polishing and Buffing—Same general equipment used for grinding, polishing and buffing ordinary steel may be used for stainless steel. Surface speed of wheel, however, is generally higher, running from 5000 to 10,000 surface feet per minute. Since stainless has low thermal conductivity and high abrasive resistance, operator should not try to overcome the high frictional quality by too much pressure on the wheel. Light gages of the 18-8 S stainless variety may be distorted and straight chromium types may gall or score if this precaution is not heeded.

Accepted commercial procedures are also available for electropolishing, coloring and plating on stainless steels. A blackening process, described by Mr. Huston, is applied by pickling and drying the parts, then immersing them in a molten bath of sodium bichromate at 750°F for 20 to 30 minutes. They are then removed, cooled, rinsed and dried.

In discussing plating, it was brought out by Mr. Huston, that various metals are electrodeposited on stainless for color matching, lubrication in cold heading, coil forming, and wire drawing processes, to prevent galling and to prevent superficial rusting where appearance is important. In plating on stainless, surface is first activated to remove the passive film by immersing the parts in 20 per cent sul-

(*Please turn to Page* 132)

Percentages of Alloying Components

. . . *in metals determined by Geiger counter type unit*

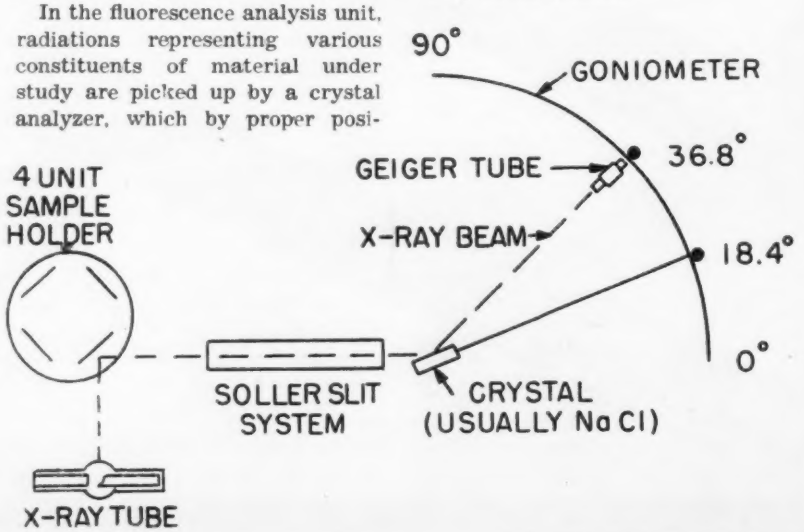
UTILIZING a new x-ray diffraction technique, a Geiger counter type fluorescence analysis unit recently developed by North American Phillips Co. Inc., New York, will receive its first commercial use at the plant of Babcock & Wilcox Tube Co., Beaver Falls, Pa. The recently purchased fluorescence unit, one of the first five units constructed, makes possible nondestructive, rapid, quantitative analysis of elemental constituents of metals, alloys, chemical mixtures and compounds, minerals and ores.

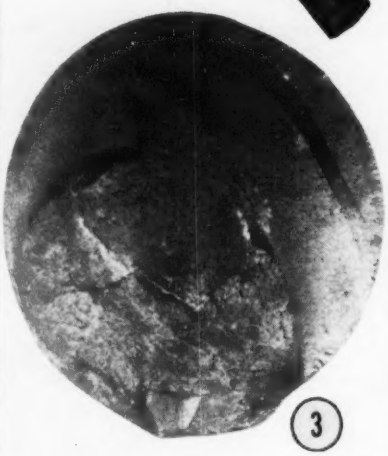
It is one of a set of three x-ray diffraction instruments acquired by the tube company which will broaden its facilities for industrial research in both the manufacture and application of tubing. Other two instruments, a Geiger counter spectrometer and an x-ray diffraction unit, extend the scope of fine structure analysis down to ultimate architectural pattern of atoms in space, far beyond the ability of a microscope. Diffraction unit records its analysis on film, while spectrometer speeds anaysis by use of a Geiger counter and recording of results on a chart.

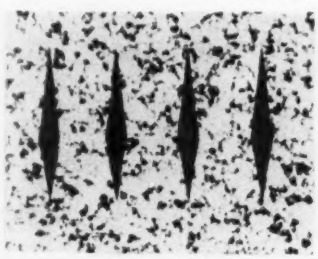
In the fluorescence analysis unit, radiations representing various constituents of material under study are picked up by a crystal analyzer, which by proper positioning reflects each of the individual radiations at a specific angle. Thus singled out each component of the radiation may be measured by means of a Geiger counter. This instrument is accurate to the order of one part in ten thousand.

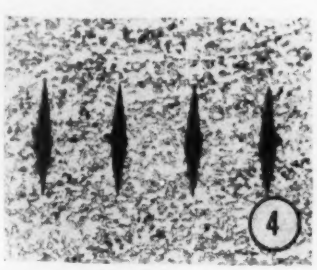
Use of the instrument can be better explained, however, by discussing a typical problem such as determining the cobalt, nickel and chromium content of an unknown alloy. A specimen of the alloy is placed in the four unit holder, shown in the accompanying illustration, along with standardizing specimens containing known percentages of alloying elements.

In order to find percentage of cobalt in the unknown alloy, Geiger counter is set at a 36.8 degree mark on goniometer scale as indicated in table of reflection angles. Next, sodium chloride crystal position is adjusted to one-half the Geiger counter angle or 18.4 degrees. By rotating specimen holder, readings are taken first on one or more cobalt standardizing samples and then on the unknown. By comparing readings and referring to a calibration chart, percentage of cobalt may be determined.









SELECTING

Engineering Materials

FOR COKE PLANTS

Knowledge of important physical and mechanical properties of alloys assist in choosing correct metal for replacement in case of failure. Various types of steels are cataloged. Examples of failures are cited, the weakness in each case discussed and corrective measures suggested

By C. F. Pogacar
Senior Fellow
Mellon Institute of Industrial Research
Pittsburgh

COKE plants have a relatively small amount of moving apparatus and most of this is slow speed and fairly rugged, thereby eliminating many possible troubles. Failure of coke plant metals by wear looms as a large factor. One is confronted with metal to metal wear, with a similar degradation aggrevated by such abrasives as sand or breeze, and with the direct wear of metals by nonmetallics such as coal or coke. The latter two cases are usually called abrasion. Then there is the more complicated case where abrasives are transported by liquids, with erosion as a result and trouble really begins when corrosive forces operate.

Fig. 2 shows the results of excessive creep under high temperatures. This tube taken from a 750 degree Fahr., 750 pound per square inch boiler was entirely satisfactory under those design conditions. When the tube got appreciably hotter because of a condition causing secondary ignition in the zone of the pipe, as determined after its examination, the added stresses, produced by the abnormal pressures, exceeded the even lower resistance values. For each temperature there is a maximum stress which will produce a creep rate, that is, continuous elongation with time, of approximately 0.1 per cent per 1000 hours. Stresses producing such rates are acceptable, in most cases; greater ones, of course, are not. That the stress in the pipe under consideration was gradually built up and that the yield point of the metal was exceeded relatively slowly are reflected in the extreme thinning of the tube prior to fracture. An explosive reaction would have opened up the tube with no elongation of the metal or its concomitant reduction in thickness.

Proof that extremely high temperatures were reached was obtained metallographically. Fig. 4 (top) shows the microstructure of the undamaged metal in a specimen cut from the section of the tube marked "5" in Fig. 2. The structure is normal for the plain carbon steel in question and the hardness as measured by the Knoop hardness indentations were made on a Tukon tester with 500 gram load. Indentation is 166. Fig. 4 (bottom) is the same steel, but the specimen was cut from the edge of the fracture at the center of the burst lip. Those initiated in the arts of microscopy will identify the fine pearlite and possibly martensite responsible for the hardening as shown by the smaller Knoop indentations which in this case have an average value of 301 hardness units. Actually the amount of hardening is small because of the low-carbon content, but that there is any hardening at all is proof of a rapid cooling from a heat treating temper-

Fig. 1—Hadfield steel hammers from a tar pitch hammer mill

Fig. 2—High temperature fracture of a 2½-inch boiler tube showing flow of metal due to excessive pressure at high temperatures

Fig. 3 — Typical fatigue failure which occurred at sharp fillet between 5½ and 6 inch diameters on an axle

Fig. 4—Micrographs of failed boiler tube shown in Fig. 2. Specimen at top is from undamaged section; Knoop hardness number, 166. Specimen at bottom is from edge of fracture; Knoop hardness number, 301. Micrographs at 250X, picric acid etch

With Electric Utilities spending

4½ BILLION DOLLARS in the next 3 years to

assure an adequate supply of electric power,

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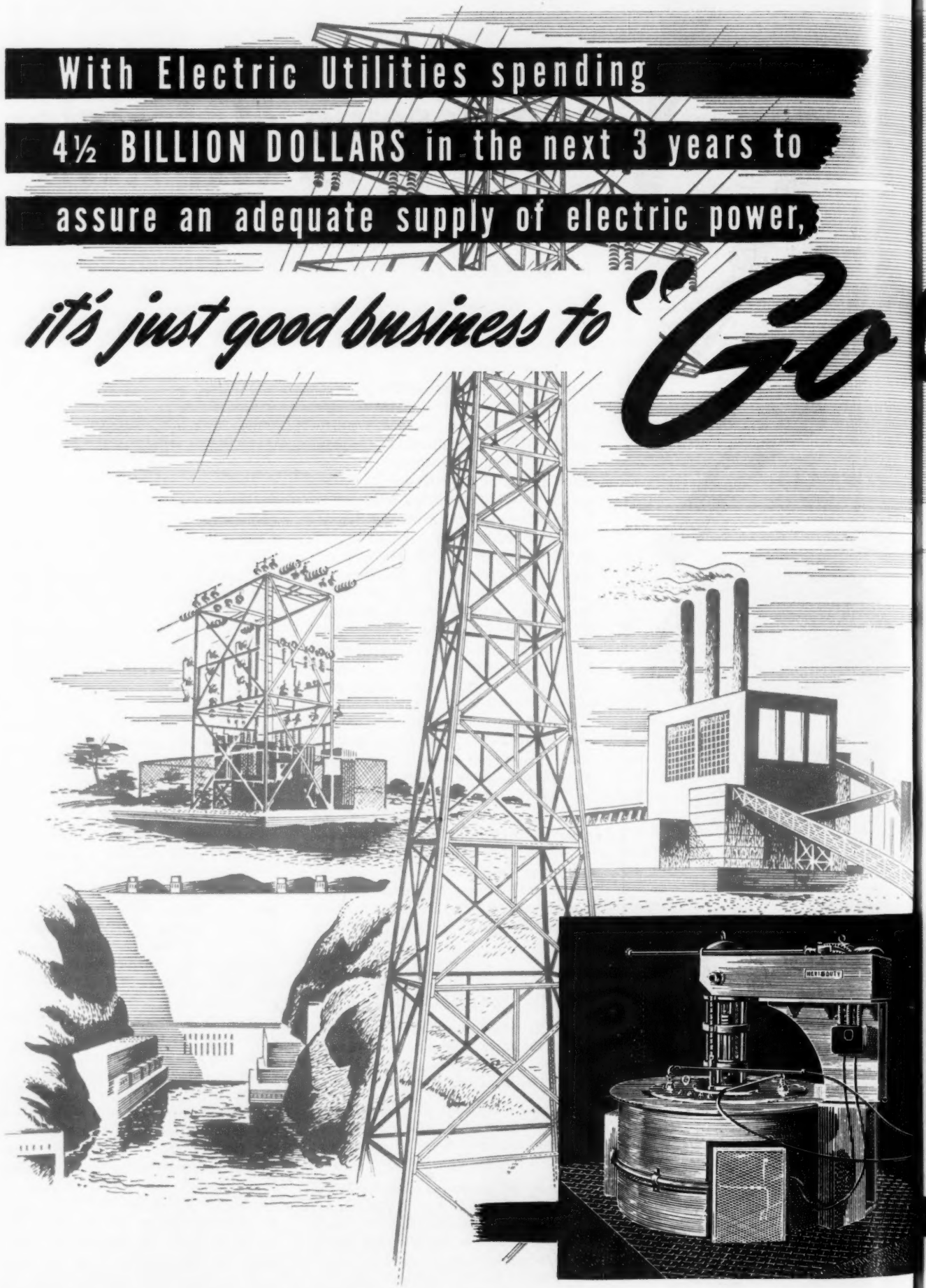

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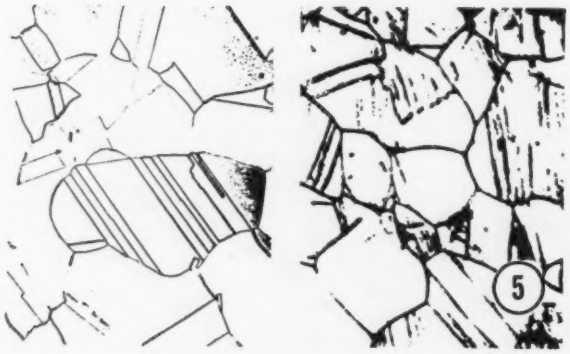


RELATIVE COSTS OF THREE TUBE BUNDLES
(Including 2 tube sheets, 1 tube spacer and 246 tubes 1" O.D.x19'-6" long)

	Carbon Steel	Cr-Mo Steel	Stainless No. 304
Relative cost of pipe	$1.00	$3.30	$12.60
Per cent increase over carbon steel		230	1120
Cost of bundle using 13 ga. tubes	$3,190	$4,510	$13,600
Per cent increase over carbon steel		41	326
Cost of bundle using 16 ga. tubes			$8,533
Per cent increase over carbon steel			167
Useful life	1 yr.	2 yr.	20 yr.
Cost per year	$3,190	$2,225	$680

ature. When water flashes into steam or when steam is further superheated, it picks up heat. This same endothermic reaction occurs when the water and steam escape through the fracture at the terrific speeds imaginable and this removal of heat serves to quench the steel just as effectively as though it were quenched in oil or water. But before a steel can be hardened, it must be heated to at least 1350 degrees Fahr. Hence, this tube was a lot hotter than its fabricator ever expected it to be.

When a material is subjected to repeated or cyclic stresses, as for instance an element of an axle which goes from a maximum tensile stress to a maximum compressive stress during each revolution of the shaft, the allowable stresses are controlled by the so-called fatigue limit. If this limit is exceeded, fracture is inevitable and the appearance of the broken surfaces are always typical. Since fracture begins as a fine crack at the surface where stress is a maximum, the subsequent strains produce a rubbing or galling action between the faces of the crack. This tends to polish those surfaces which, of course, continually grow deeper with time because of the added notch effects or stress raisers. Finally the crack progresses so far that the remaining whole metal can no longer maintain the loads and that portion breaks off in a brittle manner. The fracture then shows up with two distinct surface appearances; one a smooth, polished, but slightly tarnished surface, and the second, which was last to fail, a bright, but jagged and crystalline appearing surface. Hence, it is easy to see why years ago such failures were attributed to the "crystallizing" of the metal, whereas, by definition, metals as used are always in the crystalline state.

Fig. 3 shows a fatigue fracture which, except for a few minor variations, is exactly like any other fracture.

Since a fatigue failure starts at the point of greatest stress and, therefore, in most machinery applications, on the surface of shafts, it is necessary, in order to prevent such failures, to have adequate strength on and just below the shaft surface. If stresses are high, a case-hardened surface, one carburized and heat treated, may be required. If there are design complications and drastic quenches are impossible, an oil hardening alloy steel may be the answer. In any event, prevention of such failures is accomplished by providing sufficient strength where needed and no amount of alloying elements will

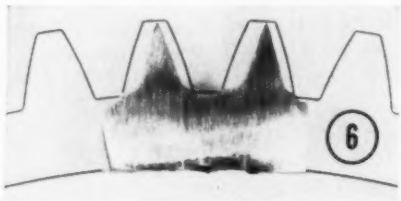
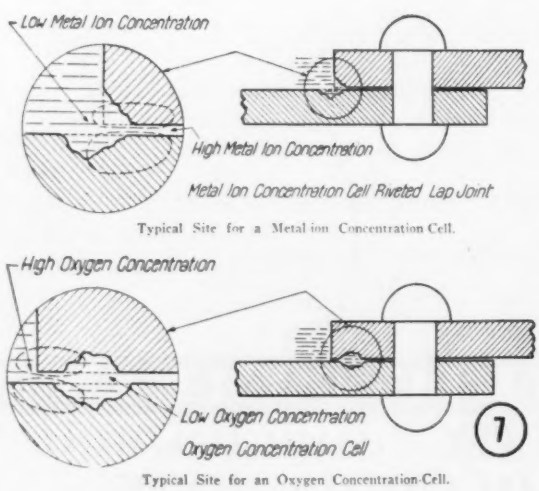


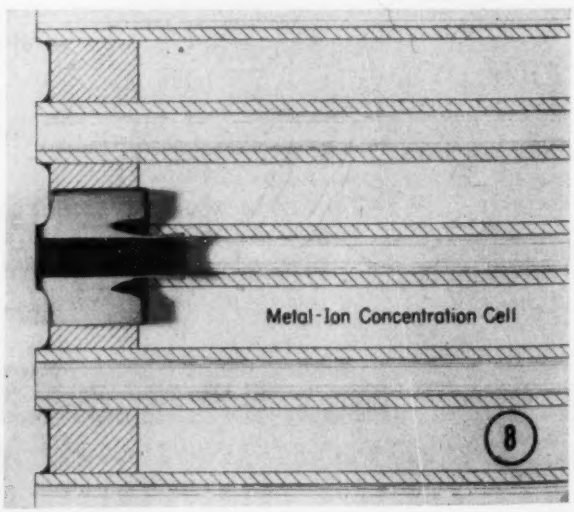
Fig. 5—Type 316 stainless steel. Micro at left shows typical annealed condition; at right intergranular attack after a sensitized or carbide precipitation heat treatment. Electrolytic etch in 10 per cent oxalic acid—500X)

Fig. 6—Extreme wear on open-type spur gear, 61 teeth, 2 diametral pitch

Fig. 7—Schematic diagram of concentration cells (W. O. Binder)

Fig. 8—Metal-ion concentration cell causing extreme corrosion between tube and tube sheet of low-carbon steels


Low Metal Ion Concentration
High Metal Ion Concentration
Metal Ion Concentration Cell Riveted Lap Joint
Typical Site for a Metal-ion Concentration Cell.
High Oxygen Concentration
Low Oxygen Concentration
Oxygen Concentration Cell
Typical Site for an Oxygen Concentration Cell.



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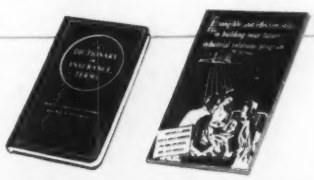

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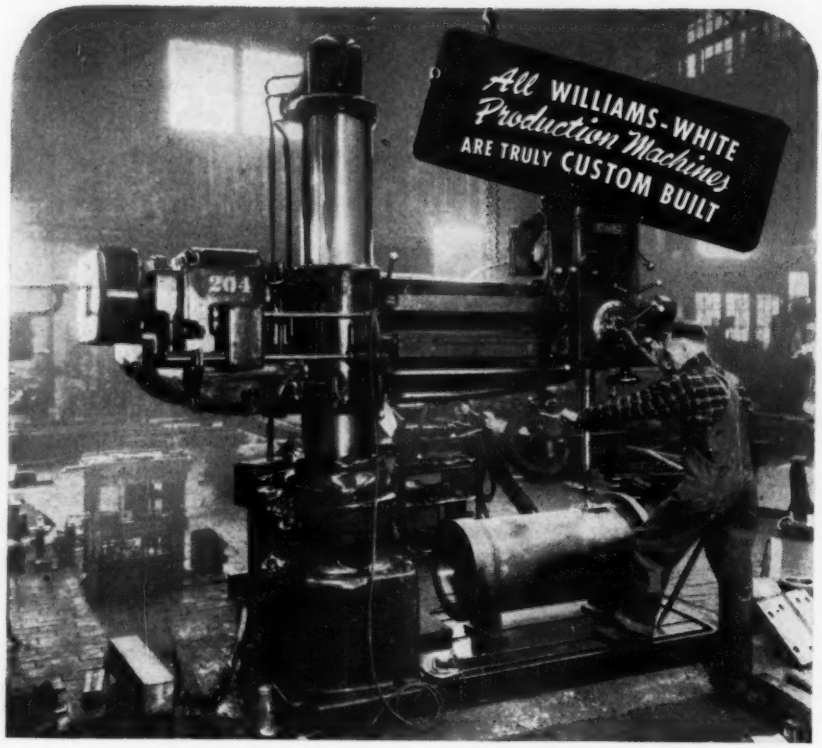
Offices in Principal Cities—Consult Your Telephone Directory



Robert Pilg, for 12 years an employe of WILLIAMS-WHITE & CO., operates a radial drill in the machine shop.

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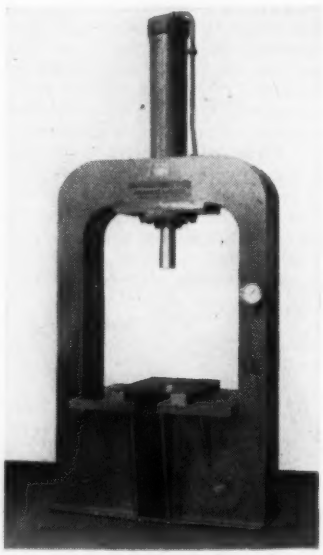

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PUNCHES, ROLLS

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MOLINE, ILLINOIS

satisfy without the additional proper heat treatment.

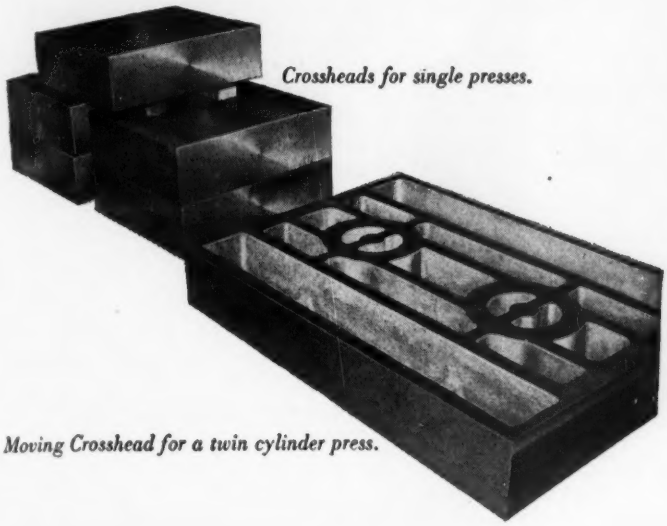
Because open gearing is not ordinarily lapped finished, the machine tool leaves high and low spots on the surfaces, however small these differences may be. Consequently it is said that gear teeth will wear until well worn in, after which they will never wear out. But if coke breeze is used for a lubricant instead of oil, the result is that shown in Fig. 6.

Fig. 1 shows the "before and after" pictures of 13 per cent manganese Hadfield steel hammers as used in a hammer mill. Such material, also used for railroad frogs and crossing centers, hardens with repeated impacts and gets harder and harder with use. This is true when the impacts are sufficient to cause the work hardening which is just barely the case when such hammers are used to crush coal. But in this instance, the hammer on the right was used in a mill to crush tar pitch and, although the pitch was not hard enough to provide the necessary impact support, it was abrasive enough to wear the hammer away. In this case a harder metal is required from the beginning. A more reasonable wear-life is obtained from a highly case-hardened hammer which in addition has a sufficiently ductile core to resist failure by breakage in the shank.

Another example that will be familiar, even without an illustration, is that of the wear occurring on reciprocating rods in the zone of packing glands, as for instance, in pumps. The packing of leather, asbestos or similar soft materials can be extremely abrasive. Again a hard metal is required and perhaps a case-hardened rod of about 650 brinell hardness may be indicated. However, if the pump is handling hot liquids, the conducted heat plus that produced by friction may be sufficient to raise the temperature of the rod to some 700 degrees Fahr. or higher. Heating the rod in this manner is just as effective as any heating in a furnace with the resultant tempering of the steel. The end result is a reduction in hardness in accordance with the heat treating characteristics of that steel. Physical property charts shown that the hardness can drop 450 or 425 brinell without much difficulty. Hence, soon after the units are placed in operation the rod loses its original properties and failure by wear is a matter of time. Therefore, where temperature is a factor, the properties at the higher temperatures should be considered which, as in this case, might require a tool steel type of alloy.

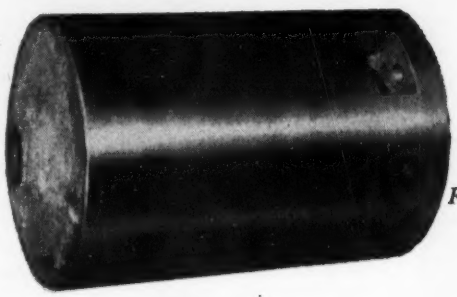
Although there is an increasing tendency to try to catalog corrosive

"MEEHANITE® castings very satisfactory—providing uniformity and machinability"

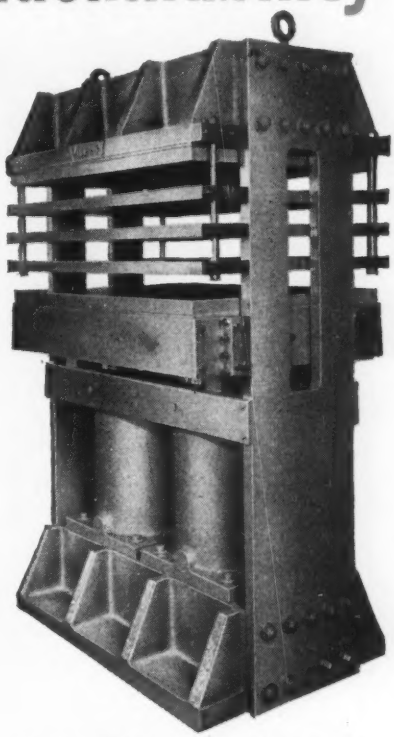


Crossheads for single presses.

Moving Crosshead for a twin cylinder press.



Finish machined Meehanite ram.



Viceroy Plate Polishing or Molding Press. Platens 36" x 48". Stroke 18"

THE Viceroy Manufacturing Company Limited, West Toronto, Canada, leading manufacturers of platen presses for rubber molding, make the above statement when providing reasons for the extensive use of Meehanite castings in their product.

In their line of presses Meehanite castings are specified for the cylinders, rams, crossheads, grids and bases, as well as for other machinery manufactured by this firm.

In addition to uniformity and machinability, Meehanite castings supply these components with better wear resistance, adequate strength properties and solidity.

Besides these general engineering castings, the same production and metallurgical controls are utilized in the manufacture of the special types of heat, wear and corrosion-resisting Meehanite castings.

For further details on the engineering characteristics available in Meehanite castings write for our bulletin "The Vital Component — Good Castings."

MEEHANITE®

MEEHANITE FOUNDRIES

American Brake Shoe Co.	Mahwah, New Jersey
The American Laundry Machinery Co.	Rochester, New York
Atlas Foundry Co.	Detroit, Michigan
Banner Iron Works	St. Louis, Missouri
Barnett Foundry & Machine Co.	Irvington, New Jersey
E. W. Bliss Co.	Hastings, Mich. and Toledo, O.
Builders Iron Foundry Inc.	Providence, R. I.
H. W. Butterworth & Sons Co.	Bethayres, Pennsylvania
Continental Gin Co.	Birmingham, Alabama
The Cooper-Bessemer Corp.	Mt. Vernon, Ohio and Grove City, Pa.
Crawford & Doherty Foundry Co.	Portland, Oregon
Farrel-Birmingham Co., Inc.	Ansonia, Connecticut
Florence Pipe Foundry & Machine Co.	Florence, New Jersey
Fulton Foundry & Machine Co., Inc.	Cleveland, Ohio
General Foundry & Manufacturing Co.	Flint, Michigan
Greenlee Foundry Co.	Chicago, Illinois
The Hamilton Foundry & Machine Co.	Hamilton, Ohio
Johnstone Foundries, Inc.	Grove City, Pennsylvania
Kanawha Manufacturing Co.	Charleston, West Virginia
Koehring Co.	Milwaukee, Wisconsin
Lincoln Foundry Corp.	Los Angeles, California
The Henry Perkins Co.	Bridgewater, Massachusetts
Pohlman Foundry Co., Inc.	Buffalo, New York
Rosedale Foundry & Machine Co.	Pittsburgh, Pennsylvania
Ross-Meehan Foundries	Chattanooga, Tennessee
Shenango-Penn Mold Co.	Dover, Ohio
Standard Foundry Co.	Worcester, Massachusetts
The Stearns-Roger Manufacturing Co.	Denver, Colorado
Traylor Engineering & Mfg. Co.	Allentown, Pennsylvania
Valley Iron Works, Inc.	St. Paul, Minnesota
Vulcan Foundry Co.	Oakland, California
Warren Foundry & Pipe Corporation	Phillipsburg, New Jersey
Washington Machinery & Supply Co.	Spokane, Washington
E. Long Ltd.	Orillia, Ontario
Otis-Fensom Elevator Co., Ltd.	Hamilton, Ontario

"This advertisement sponsored by foundries listed above."

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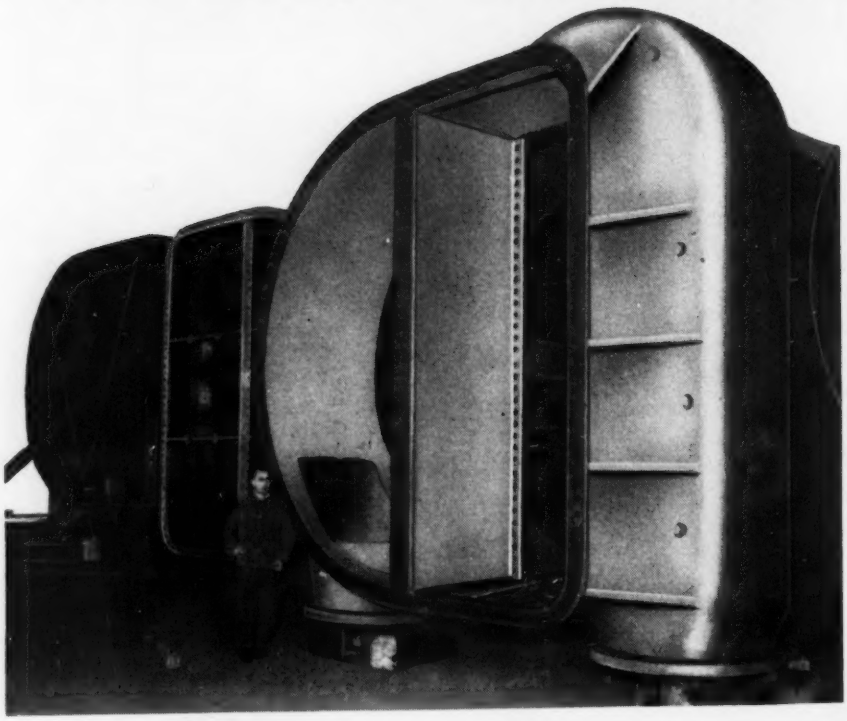
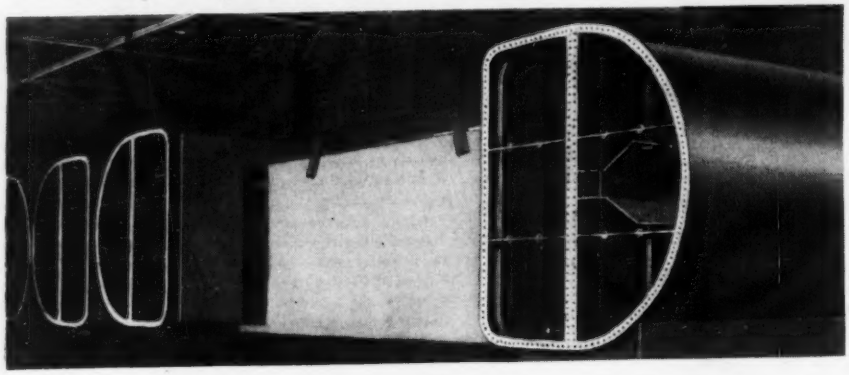
Heavy Steel Platework of Every Description



Three of these giant twin-type steam condensers were fabricated by Ingalls and purchased by the Condenser Service and Engineering Co., of Hoboken, N. J., for the Los Angeles Municipal Department of Water and Power.



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AND SOLID
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STEEL VESSELS

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STEEL

THE INGALLS IRON WORKS CO., THE INGALLS SHIPBUILDING CORP., Birmingham Tank Co. • Fabricating Plants at Birmingham, Verona, Pa., and Pascagoula, Miss. Offices at BIRMINGHAM, Pittsburgh, New York and New Orleans.

SPECIALISTS IN STAINLESS STEEL FABRICATION

reactions as to their outward appearances, as a fact there are only two possible types of corrosion. The direct chemical reaction and the electrochemical attack involving anodic and cathodic reactions. The former method is best exemplified by the relatively simple chemical reactions occurring between metals and gases. In many such cases the results are of direct benefit as, for instance, the formation of impervious oxide films on aluminum and stainless steel by means of which further corrosion protection is provided. On the other hand, the high temperature gaseous reactions with metals in jet engines is a distinct detriment. The second or electrochemical type of corrosion is concerned with (and useful in explaining) even apparently different looking corrosive results. Because of certain recurring characteristics these products have been defined by recognizable names such as:

Galvanic—two dissimilar metals
  Stray Current
Concentration cell (oxygen or metal-ion)
  Water-line attack
  Pitting corrosion
Intergranular
  Grain boundary attack
Stress-corrosion
  Caustic embrittlement
  Corrosion fatigue
Soil Corrosion
Atmospheric Corrosion

Although several other names are tagged to forms of corrosion, such as underwater and uniform corrosion, these are primarily descriptive rather than definitive terms. In addition, there are several names given to specific nonferrous modes of attack such as season-cracking and dezincification in the brasses.

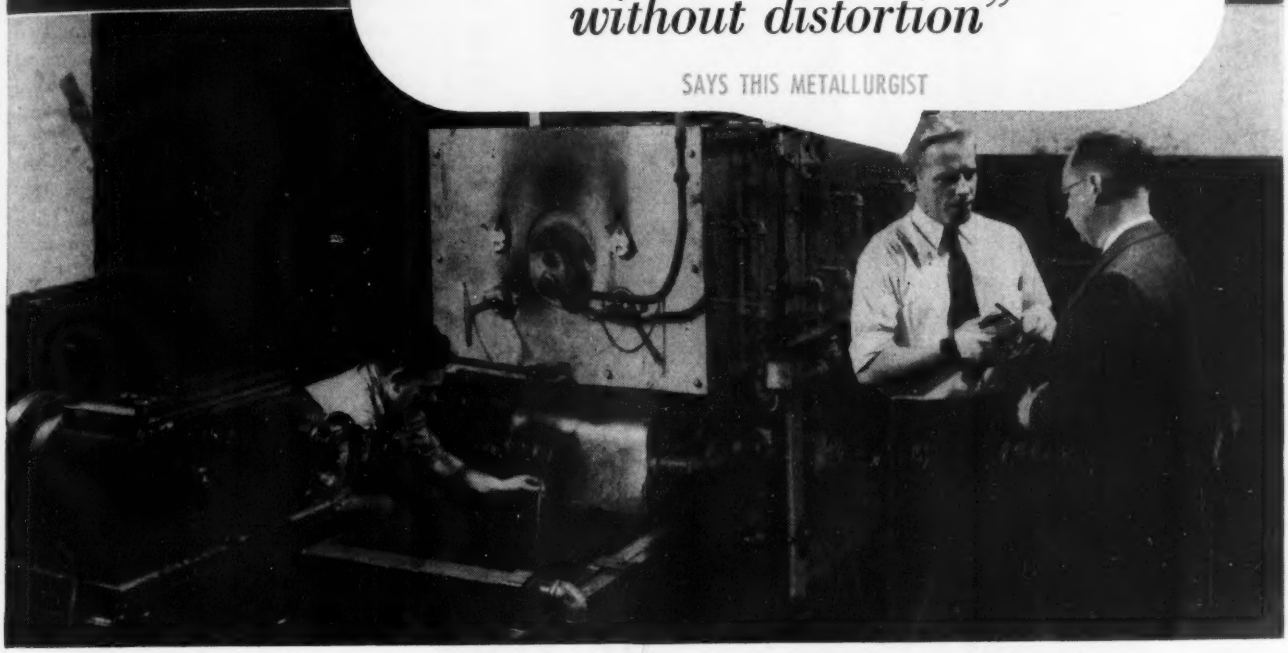
In common with the theory every one of these methods of attack requires an electrolyte and not withstanding that one may be found underground, one in the air and perhaps another in sea water, they all obey the same laws of electrochemistry, at least insofar as experiments have been able to show. Only the first three listed will be amplified by other figures, but the second three will be introduced with the explanations of the concentration cell.

Although one skilled in such matters can identify the type of corrosion and can in most cases prevent a similar failure by retrospection, he cannot predict corrosion results for a new set of conditions or metals without recourse to appropriate corrosion data. There are few chemical processes so identical as to present the same corrosion problems which in turn can be solved in the same manner. Because of this it is often advisable to run corrosion tests under, and preferably in, the operating conditions being considered to obtain the best answer for that set of con-

"WITH Gulf Super-Quench

we get uniform hardening without distortion"

SAYS THIS METALLURGIST



A metallurgist of the Corbin Screw Division, American Hardware Corporation, New Britain, Conn., consults with a Gulf Lubrication Engineer (right) on results obtained with Gulf Super-Quench in heat treating a wide variety of parts.

—"and we eliminated the need for water quenching."

"TYPICAL of the wide variety of parts we harden in Gulf Super-Quench are roll thread dies," says this Metallurgist. "These are long flat pieces which require uniform hardness over the entire surface and deep penetration. With Super-Quench we obtain the desired hardness without the distortion we'd get from water quenching. Results with Super-Quench have been so outstanding that we have no need for a water-quench setup."

Here's why Gulf Super-Quench is a superior quenching oil: It has intensified dual-action—a faster cooling rate through the hardening temperature range, and the slow speed of conventional quenching oil below the hardening temperature range.

Call in a Gulf Lubrication Engineer today and let him show you how Gulf Super-Quench can help improve your quenching practice. For your copy of the brochure on Gulf Super-Quench, send the coupon below.

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CAN BE BUILT FOR SPEEDS OF 50 TO 150 FT. PER MINUTE

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All 84" PAXSON SLITTERS are built to customer's special requirements and can be delivered in approximately six months time. We will be pleased to discuss your requirements with you or your engineers at any time.

Due to the extreme length of the rolls in the 84" PAXSON SLITTER, provision has been made to take care of their deflection by an adjustable shoe which rides on spacers above and below the 6" diameter rolls. Both upper and lower rolls are supported; supports are adjustable laterally to facilitate the spacing of cutters.

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PAXSON MACHINE CO.
SALEM, OHIO

ditions. Obviously, one should be careful in interpreting published corrosion data, either technical literature or advertising, which applies perfectly to the conditions cited, but may only approximate those at hand.

If metals are subject to corrosion in a liquid environment and such attack does begin in an out-of-the-way corner or place, the chances are great that because of the mechanics involved, two different solutions will be located reasonably close to each other. This is illustrated in the schematic diagrams in Fig. 7. In the one case the liquids will have two different concentrations of the metal ion in solution. And in the second case the liquids will have two different oxygen concentrations. The result again is electrolytic in that the same metal immersed in two different liquids of similar ions (and electrically connected) will produce a current whose tendency it will be to further aggravate the situation. A casual study of the diagrams will lead to that conclusion.

These so-called metal-ion or oxygen concentration cells go far toward explaining crevice attack, attack under bolt heads, under mill scale, or under deposits such as dirt or sand as happens occasionally in condenser tubes. In certain environments once an incipient crack is started because of stresses, the same concentration effects finally promote a stress-corrosion failure. Similarly if the corrodent is caustic as for instance in boilers as part of the water treating chemicals, the result produced in like manner is called caustic embrittlement. Actually in the latter case there is no embrittlement of the steel, but because the corrosion is intergranular, the final fracture occurs without any reduction in area, therefore having the appearance of a brittle fracture. Certainly, pitting corrosion as such is a product of cell attack and soil and atmospheric corrosion are direct results of oxygen concentration cells. To be sure, these are over simplications of admittedly difficult problems, but a truer picture will be had if they are considered in such a collective manner.

Fig. 8 shows an extreme case of a metal ion concentration cell in a tar-acid still tube-sheet and tube. Exactly the same thing occurs between the tube spacer in the center of the bundle and the section of the tubes going through the spacer.

A greater quantity of stainless steel, of all grades is finding its way in coke plants and chemical plants generally, than ever before. That is the way it should be, if the battle against corrosion is going to be ef-

fective. In many cases, merely doubling the life of a unit by small improvements in alloy additions is not enough in view of the high maintenance and shutdown costs. However, there is no point in paying for stainless steel if the metal received is not "stainless" regardless of the purported alloying contents.

Fig. 5 shows the micrographs for two specimens of 18-8 stainless steel. The difference in their appearance is striking and one could almost guess that the steel on the left will be resistant to corrosive attack according to all expectations while the one on the right will fail miserably. This is what happened which is not remarkable until it is explained that both metals are exactly the same heat of steel. The one on the right was heated to some 1200 degrees Fahr. for ease in fabrication and the one on the left is in its properly annealed state as it should be. The faulty heat treatment promotes a precipitation of chromium carbides in the grain boundaries. This action obviously ties up the much needed chromium and leaves the impoverished metal wide open for attack. The result is a grain boundary corrosion which gets worse as action proceeds because of the dissimilar constituents in contact and again electrolytic cells are doing their utmost. If allowed to proceed far enough and all boundaries are attacked from surface to surface, the metal will crumble.

Metallurgical factors to be considered in selecting an alloy may run the gamut in the metal's history, from the method of its manufacture through all the stages of its fabrication and heat treatment. For instance; certain applications may require electric furnace steels while others can use bessemer products, highly polished surfaces may be required in one case while an as-cast finish may be suitable in another, and whereas annealing may be mandatory in one instance, a stress-relieving treatment may be sufficient in yet another. Thus the original selection of a material for an application may have its problems, but the substitution of one material for another (one having fewer procurement difficulties in our present markets) invites many more questions than appear on the surface.

Solution may require more than just the turning of a crank. Unquestionably, your first consideration in choosing a steel for a plant application must of necessity be a correlation of the physical requirements demanded by the application with the properties available in the metal. Having determined these re-

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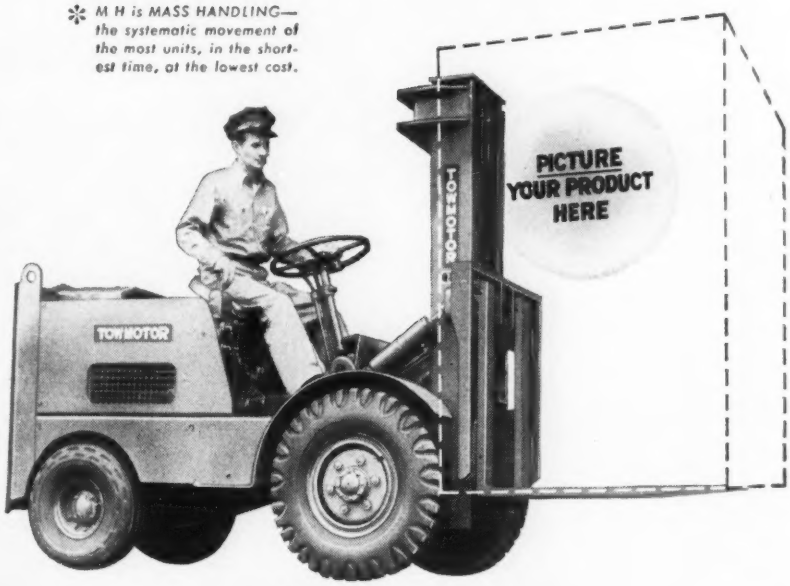
* M H is MASS HANDLING—the systematic movement of the most units, in the shortest time, at the lowest cost.



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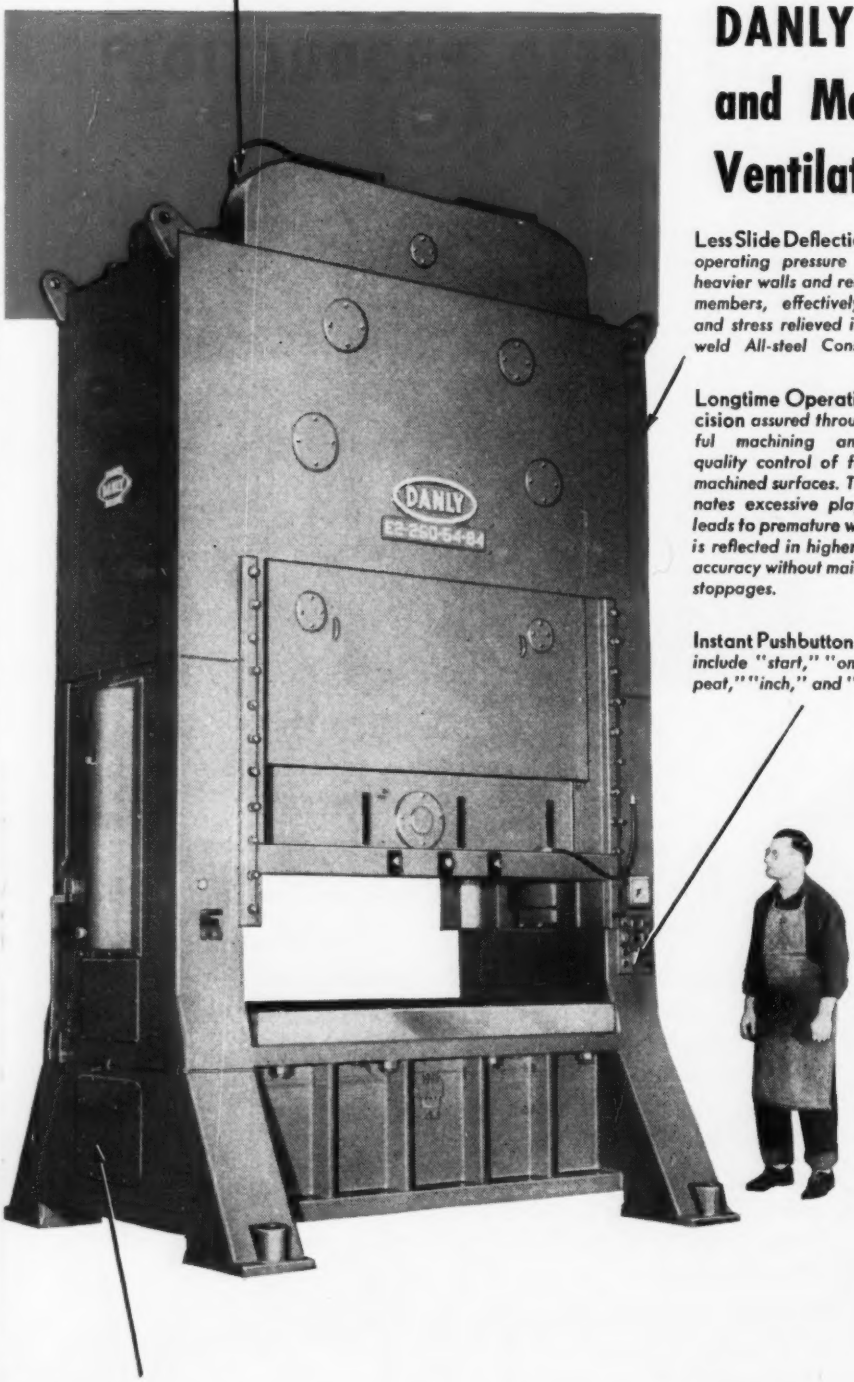
Danly Clutch *designed for repetitive engagements under severe operating conditions of power press work. Long service life of this vital press mechanism offers major reduction in maintenance. (See detail on page opposite.)*



DANLY PRESSES Cut Production and Maintenance Costs with New Ventilated DANLY CLUTCH

Less Slide Deflection *under operating pressure due to heavier walls and reinforcing members, effectively joined and stress relieved in Danly-weld All-steel Construction.*

Longtime Operating Precision *assured through careful machining and rigid quality control of functional machined surfaces. This eliminates excessive play, which leads to premature wear, and is reflected in higher product accuracy without maintenance stoppages.*

Instant Pushbutton Controls *include "start," "once," "repeat," "inch," and "reverse."*

Down-time because of clutch maintenance, a major factor in controlling production costs in power press operations, is greatly reduced with Danly Presses equipped with the new ventilated air friction clutch. The new clutch, illustrated at right, is one of the reasons why Danly Presses give longer service with little maintenance attention.

A continuous engagement test recently completed is proof of the superior performance of the Danly Clutch. After more than 8 million engagements, run night and day for a period of 1½ years under simulated press conditions, the disc faces of the Danly Clutch measured less than one-thousandth of an inch of wear per 100,000 clutch engagements. Other components similarly indicated unusual endurance. Air-cooled, low-starting torque, and complete automatic pressure lubrication are vital features which now offer new possibilities for press applications for the production of parts.

These new developments are characteristics of Danly progress in press engineering.

engineering service

For assistance in determining the most efficient press for your own type of stampings, call on Danly engineers. Send details about your problems.

Without obligation, you will receive specific recommendations how production costs can be reduced.

Continuous Pressure Lubrication *keeps press inoperable until working pressure is built up in circulating oil system. Each gear, bearing and driving member in the crown and slide is continuously bathed in clean filtered oil.*

Faster Setups *are permitted by a reversible pushbutton control which withdraws punch from die at any point in the stroke. This also adds safety to trial strokes when trying out new dies.*

DANLY PRESS CONSTRUCTION:

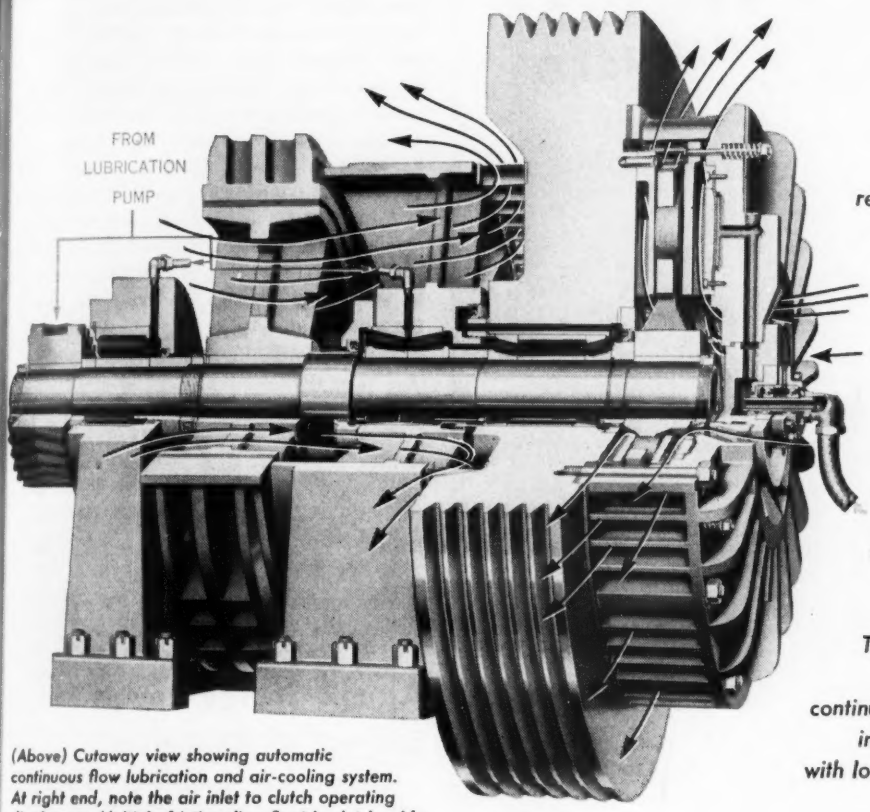
Faster Setups . . . Less Maintenance

. . . More Production

DANLY

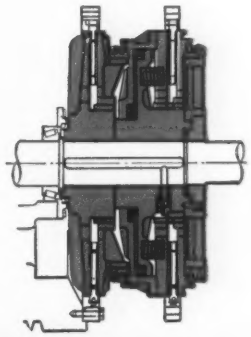
PRECISION DIE SETS...STANDARD AND SPECIAL

PRESS CLUTCH ENGAGEMENTS
. *under load* with negligible wear



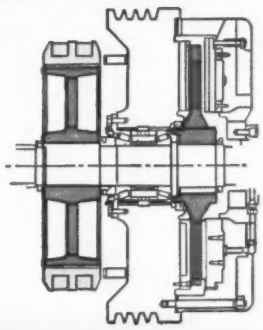
(Above) Cutaway view showing automatic continuous flow lubrication and air-cooling system. At right end, note the air inlet to clutch operating diaphragm. Multiple friction discs float in clutch spider when disengaged. Brake shoes in drum at left are spring-engaged and air-released automatically.

Cross sectional outline of conventional clutch shows relative proportion of components subject to acceleration (indicated in red).



conventional type press clutch

Note the smaller mass of accelerated components in the Danly Clutch. The larger mass (not shown in color) in continuous rotation results in easier acceleration with lower starting torque.



new Ventilated Danly Clutch

Danly Press and Clutch Features Reduce Press Down-Time

Construction features of the Danly Clutch offer specific reasons why Danly Presses cost less to operate and produce more stampings over a given period.

★ **Long Life of Friction Discs** is assured because of the low starting torque of Danly Clutches. Low-energy clutching characteristics have been achieved by a new design which requires less than one-fifth the mass in clutch components subject to acceleration, as compared to conventional press clutches.

★ **Cool Operation** further reduces wear of friction discs and provides protection of the antifriction bearings from overheating. The clutch housing itself is a cooling fan which provides high velocity ventilation through internal ports adjacent to areas where heat is generated.

★ **Automatic Pressure Lubrication** circulates clean, filtered oil to each bearing *including the flywheel bearings.* There are no grease fittings requiring periodic attention of the operator.

★ **Instant Pushbutton Activation** is produced by compressed air controlled by an electric solenoid valve.

★ **Simple Disassembly** permits inspection of parts subject to wear. This can be done in only a few minutes. It is unnecessary to dismantle entire clutch to make infrequent replacements of worn parts.

DANLY MACHINE SPECIALTIES, INC.
2100 SOUTH 52ND AVENUE, CHICAGO 50, ILLINOIS

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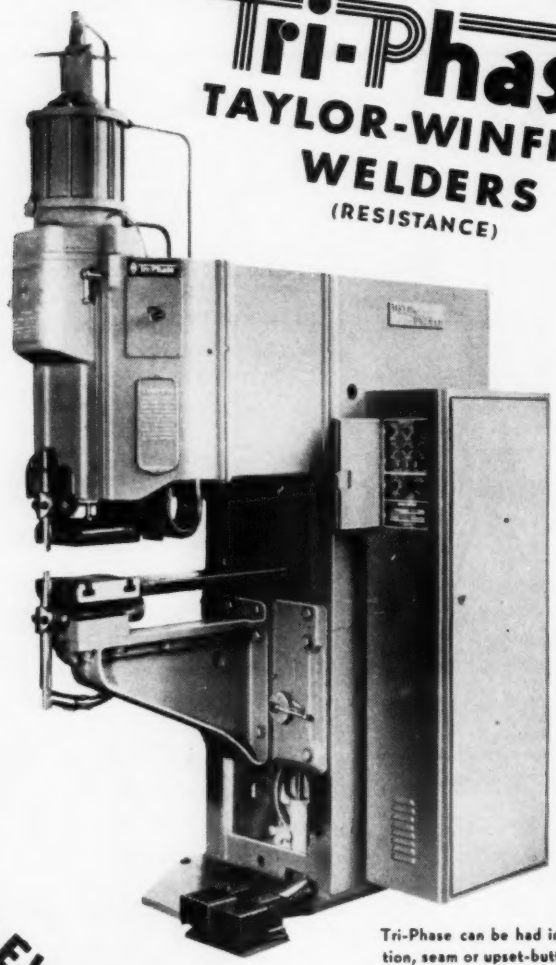
Write TODAY for valuable literature illustrating and explaining features of and suggesting profitable uses for Danly Presses. Standard Press Models available from 50 to 1,500 tons.

NOW -the New

Tri-Phase

TAYLOR-WINFIELD WELDERS

(RESISTANCE)



Tri-Phase can be had in spot, projection, seam or upset-butt welders. Shown is a T-W Tri-Phase Spot welder.

Greater Electrical Efficiency and Improved Welding Performance

POWER SUPPLY FEATURES

1. *Greatly reduced power demand.*
2. *Three phase balanced power load.*
3. *Desirable high power factor.*

DESIRABLE D. C. WELDING CURRENT

1. *More work—same welder—deeper throat depths—with essentially no increase in power demand.*

FLEXIBILITY AND VERSATILITY

1. *Can weld low carbon steel, stainless steel, aluminum, magnesium, monel, inconel, brass alloys and other materials on same welder.*

HIGH PRODUCTION EFFICIENCY AND LOW MAINTENANCE COST

Tri-Phase welders are simple, accessible and easy to maintain, and operate with simplified controls.

Full information on new Tri-Phase T-W welders sent promptly upon request. Ask for Bulletin 10-813, just off the press, or call the T-W sales engineer in your territory.

Our monthly publication "Weld-It" shows many production short cuts by resistance welding. Request it using your company letterhead.

Tri-Phase

TRADEMARK

THE TAYLOR-WINFIELD CORPORATION

WARREN, OHIO, U. S. A.

TAYLOR-WINFIELD

RESISTANCE WELDERS

quirements and properties you should specify them, no matter how rigorously, but only them, in the purchase specification. Adding other qualifications just for the sake of the specification, because of custom or habit is useless, time consuming and expensive.

A second consideration and the one which usually decides the issue is that of cost. Because of the disproportionate labor prices it may pay to re-evaluate the use of fancier, but trouble-free alloys, the next time a carbon steel or low alloy must again be replaced. Accompanying table is a compilation of some data obtained late in 1946 for a heat exchanger. Although the relative cost of stainless tubes with respect to carbon steel appears prohibitive, by the time the man-hours of labor are included the differential all but vanishes. Not only is the actual cost per year lowered many times by using the corrosion-free stainless, but also several tangibles accrue. That thinner tubes could be used undoubtedly reflects in some saving of heat. Similarly, shutdowns for replacements will be avoided and the costs cut.

From a paper presented before the Eastern States Blast Furnace and Coke Oven Association, William Penn hotel, Pittsburgh, Feb. 6.

Atomic Energy Levels Subject of Research

Complete and up-to-date compilation of energy levels of the elements as derived from observations of atomic spectra is the basis of an extensive research program now being conducted by National Bureau of Standards, Washington. Data, which will include all information on atomic energy levels accumulated in past 15 years as well as previously available material, are being published in pamphlet form by the bureau.

Pamphlets will be assembled into volumes of about 500 pages as each major portion of the work is completed. A compendium of all known energy levels as derived from analyses of optical spectra is believed necessary for workers in industry as well as those in chemistry, atomic and nuclear physics and astrophysics.

—o—

Engineering data concerning the vibrating type work loader recently announced by Landis Tool Co., Waynesboro, Pa., for use as a packaged unit is contained in an illustrated bulletin. Charts give information on selection of feed tube for varying diameters and lengths of work. A similar chart is included for selection of proper size of hopper.

Forging Practice

(*Concluded from Page* 104)

for oil field applications, mining and stone crushing parts, marine applications, aircraft forgings, boiler and pressure vessel forgings, and many others.

Commercial applications include the chemical industry, mechanics' and garden tools, ornamental iron work and similar applications. There are forged golf club heads, fishing lure bodies, casting rods and the like. It is almost impossible to consider any industry that does not use forged parts. Nearly every phase of our daily comforts is available because of forgings.

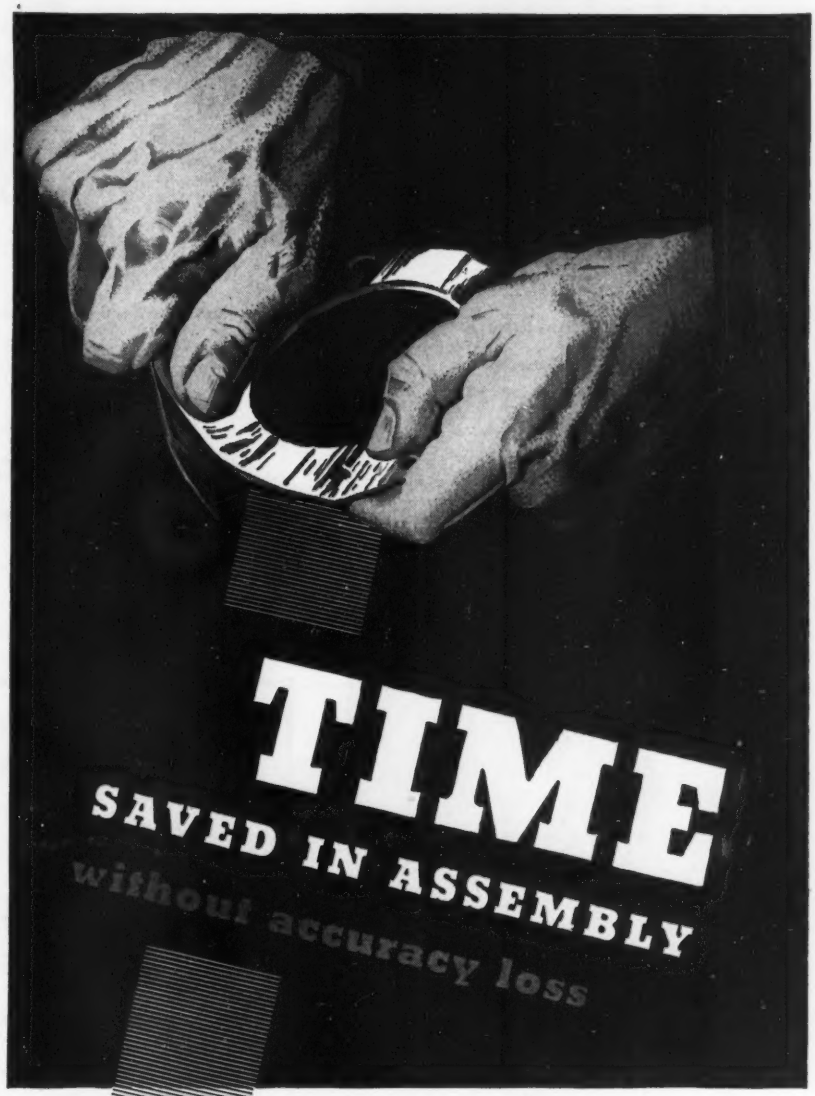
Early development of the production forging industry was in the New England states but with increased use of forgings, particularly in the automotive industry, about 60 per cent of the commercial forging tonnage is produced in the east north central states, comprising the states of Ohio, Indiana, Illinois, Michigan, and Wisconsin. Most of the balance of the forging industry is in the eastern United States. It is possible that future development of the industry will move southward and westward as those areas become more industrialized.

The change from primitive tools of the ancient smith, where the hand hammer and the 15 or 20-pound hand sledges were the heaviest forging tools to the modern forging tools is quite marked. The drop hammer has ram weights up to 50,000 pounds falling weight plus steam pressure to strike a mighty blow. Forging presses are available with forging pressures up to 20,000 tons and without doubt, larger presses will be built. The ancient dream in which Thor had a mighty hammer that could cleft a mountain has become a reality in the modern wonders that shape the hot metal in weights to over 100 tons.

(*To be continued*)

—o—

Evaporators for industrial refrigerating units made by Kold-Hold Mfg. Co., Lansing, Mich., are being welded with a 150 kilovolt-ampere circular seam welder manufactured by Progressive Welder Co., Detroit. Cold rolled sheet, hot rolled sheet, pickled sheet, 18-8 stainless steel and Monel are welded at conservative rate of 72 inches a minute to insure vapor tightness under pressure. Before seam welding, two halves of evaporator are tacked together with a few spot welds to insure alignment.



Assembly time is reduced in fitting moving parts. Users' repair and maintenance time is reduced. Adjust tolerances with LAMINUM, the "solid" shim that is peeled for adjustment.
Write for data and application chart.

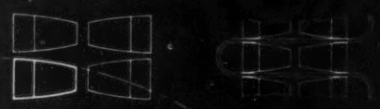
●

LAMINUM shims are cut to your specifications at our factory. Packaged shim stock for repair and maintenance work is sold through industrial distributors.

Laminated Shim Company, Inc.
Glenbrook, Connecticut

LAMINUM 3029
TRADE MARK
THE SOLID SHIM THAT peels FOR ADJUSTMENT

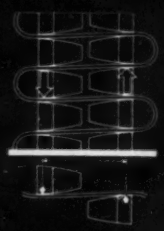
HOW FALK STEELFLEX COUPLINGS WORK



1. Grooves, in a precise arc, and with a radius and length proportional to the capacity of the coupling, are cut into two identical hubs of moderately high carbon steel—forged of Falk alloy cast steel.

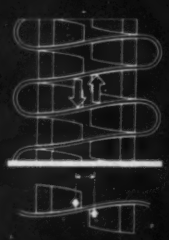
2. These grooves provide a slot for a grid member made of chrome alloy steel with an elastic limit of 180,000 pounds per square inch and an ultimate strength of 220,000 pounds per square inch.

3. This grid fits snugly into the curved grooves cut into the hubs of the coupling. The grooves provide a scientifically cut bearing surface for the grid. This bearing surface extends from the outer to the inner edge of the grooves. The grid bears on the grooves in proportion to the load.



4. Under light loads, the grid bears only at the outer edges of the grooves. This permits a long, free, elastic span between the outer edges of both hubs. Power is transmitted through almost the entire length of the grid rung.

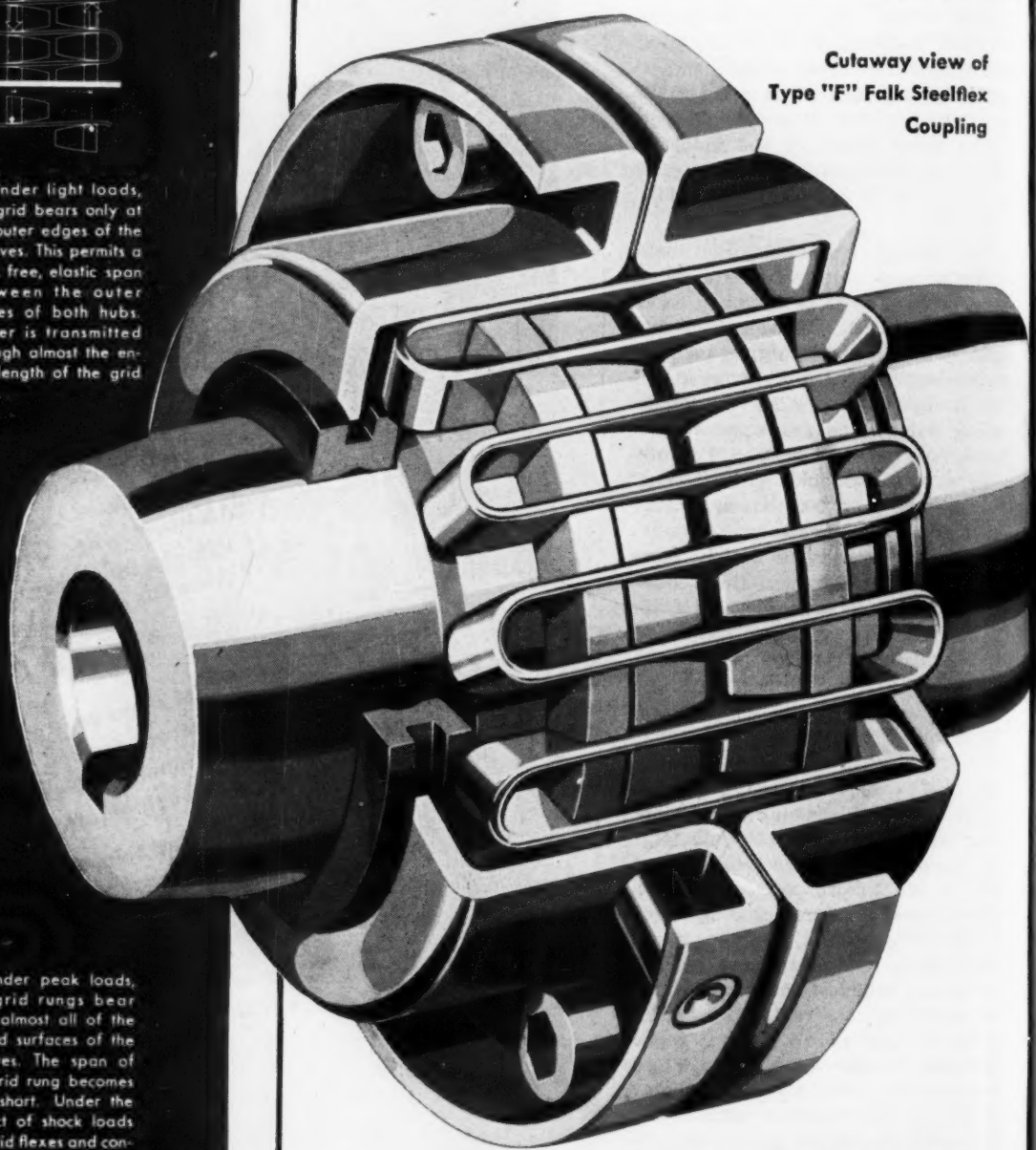
5. Under normal loads, the grid bears on a larger area of the grid grooves and the span of the grid run is shortened. It transmits more power and maintains its capacity to absorb shocks and dampen vibration.



6. Under peak loads, the grid rungs bear over almost all of the curved surfaces of the grooves. The span of the grid rung becomes very short. Under the impact of shock loads the grid flexes and continues to transmit power smoothly.

For true by the FALK

1. Consider the *application* for which the coupling is required.



Cutaway view of Type "F" Falk Steelflex Coupling

The Type "F" Falk Steelflex Coupling fills the requirements of practically all industrial applications.

economy...buy couplings

Three-Dimensional Method!

2. **Consider the *horsepower* the coupling must transmit.**

3. **Consider the *speed* (rpm) at which it is to operate.**

We at Falk have developed a simple, easy guide to economical coupling selection. We call it the "Falk Three-Dimensional Method," as it enables plant men to order Falk Steelflex Couplings on the basis of *all three* of these essential factors.

By referring to the selection tables in the Falk Steelflex Coupling Bulletin 4100, you can easily select the proper coupling for your requirements based upon horsepower, operating speed and application—not on bore size alone.

Use of this method, when buying Falk Steelflex Couplings, assures you of maximum protection for your connected machinery, low normal maintenance and greatest long-range coupling economy.

The improved Falk Steelflex Couplings we offer in 1948 represent the intensive research and actual experience in design and power transmission over the span of more than half a century. These couplings, with the universally approved Falk grid-groove design, afford surest protection against the costly, damaging effects of shock and vibration . . . they compensate for parallel and angular misalignment and permit free end float. They provide torsional resilience, flexibility and highest adaptability —in fact, the Type "F" (in many sizes) is suitable for nearly all industrial applications.

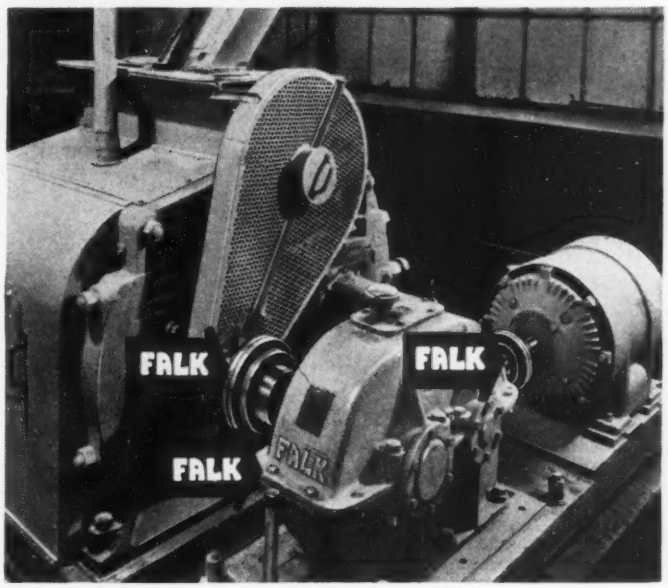
* * *

If you do not already have a copy, write for Bulletin 4100, containing dimension and selection tables which will help you attain true coupling economy.

The FALK Corporation • Milwaukee 8 Wis.

Established 1892

Precision manufacturers of Speed Reducers . . . Flexible Couplings . . . Motoreducers . . . Herringbone and Single Helical Gears . . . Heavy Gear Drives . . . Marine Turbine and Diesel Gear Drives and Clutches . . . Steel Castings . . . Contract Welding and Machine Work. District Offices, Representatives, or Distributors in principal cities.



From power to production,

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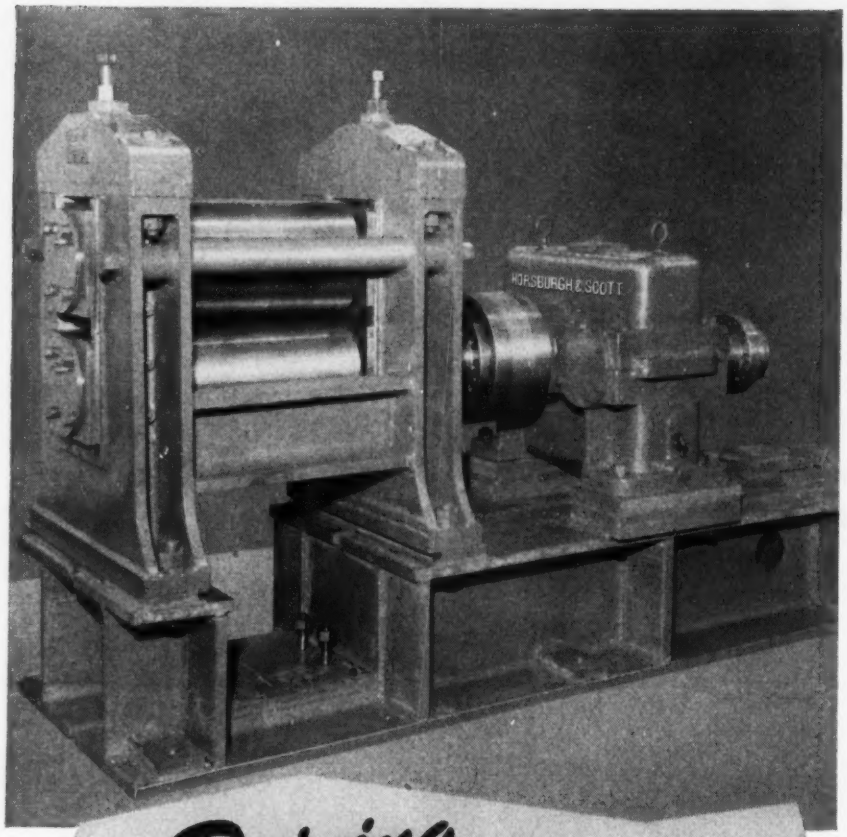
FALK

a good name in industry!



Driving
RUGGED STEEL MILL
EQUIPMENT with H&S
Reducers

Here's a Mill Roll being driven by a standard Horsburgh & Scott speed reducer in a large steel mill . . . just one of thousands of H & S pinch roll, mill and special drive installations. They are rugged, dependable and accurate, backed by years of experience in supplying speed reduction units to the steel industry.

Much information is available in our complete speed reducer catalog . . .

Send note on Company Letterhead for Speed Reducer Catalog 46

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 HAMILTON AVENUE • CLEVELAND 14, OHIO, U. S. A.

Finishing Procedures

(*Continued from Page* 108)

phuric acid at 160 to 200°F. Parts should be allowed to gas freely for one minute, rinsed well in running cold water and transferred to the plating bath while still wet to prevent passive film from forming again.

Periodic Reverse Current Plating— In discussing the present status of periodic reverse current electroplating, Dr. D. Gardner Foulke, Hanson-Van Winkle-Munning Co., Matawan, N. J., defined this new system of plating as a method in which the plating current is interrupted periodically and is followed by a short-term current reversal. Type of current heretofore employed consisted of the typical direct current supplied by generators and batteries and that supplied by rectifiers. Modifications have included superimposing alternating current, usually 60 cycle, and pulsed direct current. According to Dr. Foulke, Hanson-Van Winkle-Munning Co. now is introducing this deplate cycle as developed by the Westinghouse Electric Corp., Pittsburgh.

Commercial advantages of the periodic reverse current process were summarized by Dr. Foulke as follows: 1. Increased rate of plating, 2. improved surface brightness, 3. increased density of deposited metal, 4. improved metal distribution, 5. increased smoothness of deposit, 6. decreased porosity, 7. better corrosion protection, and 8. a method for obtaining heavier deposits.

Reflection of the condition of the base metal which is exaggerated in ordinary electrodeposition, in many cases is greatly modified. Build-up at corners and burrs, enlarging of scratches, and other factors characteristic of straight direct current electrodeposition are minimized to effect reduced polishing costs. At the time of deplating, higher current density points are selectively deplated, which results in a smoothing-out of the deposit, similar to the leveling action of electropolishing.

Method Improves Appearance — Using the periodic reverse current process, according to the theory proposed by Dr. Foulke, unsound metal is removed and each succeeding increment is smoother. Moreover, the speed of plating can be increased because the cathode film is supplied with metal ions.

According to Dr. Foulke, alkaline plating solutions have been most thoroughly investigated for periodic reverse current electroplating, and

In this unit illustrating the complete refrigeration cycle, you can see the many Wolverine products that are used by the refrigeration industry. Among them is Wolverine Trufin, THE integral finned tube, fabricated as both a condenser and evaporator coil. Trufin can help you in many ways.

$ **DEAD SURFACE AREAS**—Can be eliminated by coiling Trufin within the direct air blast from the fan to make use of every bit of surface area. You will no longer need to lose surface area at the center and corners of the coil.

$ **CRITICAL MATERIALS** in large quantities may be replaced by Trufin—helping you to avoid expensive delays.

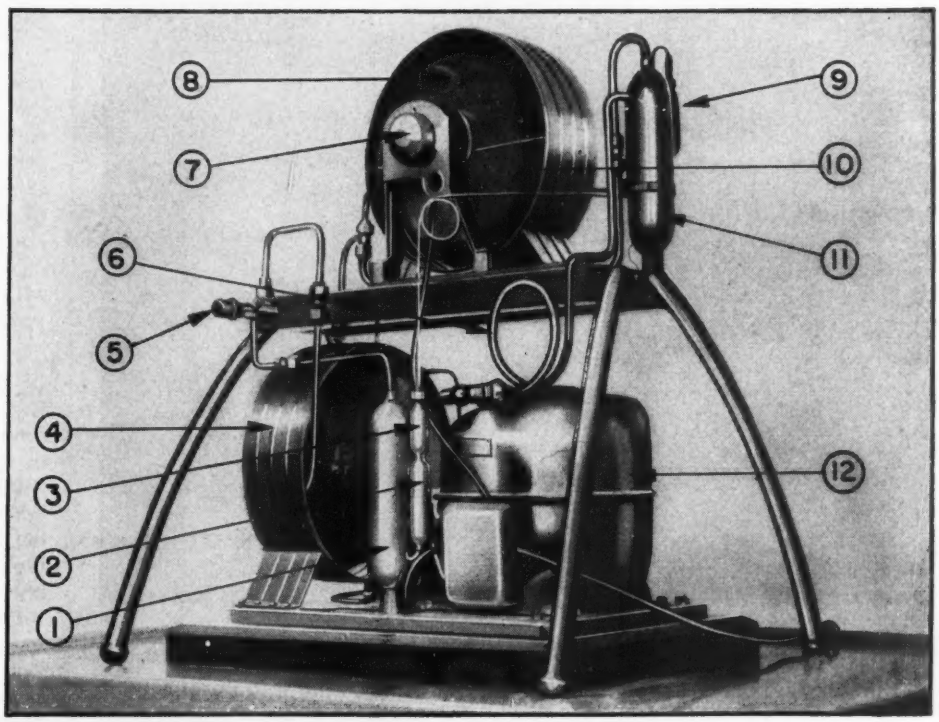
$ **LOSS OF EFFICIENCY** can be prevented. You can rely on Trufin to continue to deliver heat transfer efficiency as engineered. Trufin is integral. There is no bond between fin and tube that can deteriorate or otherwise be destroyed.

$ **SPACE,** always at a premium, can be conserved by using a compact and efficient coil of Trufin.

LEGEND

- •1 SPUN END RECEIVED—Copper.
- •2 DRIER—High side, 1" Diameter, 14 gram capacity.
- •3 FILTER—Copper, with conical Monel metal screen.
- •4 CONDENSER—$\frac{5}{16}$" I.D. x 9 fin aluminum tubing.
- 5 BACK-SEATING VALVES
- •6 SUCTION LINE—Copper.
- 7 MOTOR—Complete with fans—9 watts, 115 volts, 60/50 cycle, single phase, Type CW.
- •8 EVAPORATOR—$\frac{5}{16}$" I.D. x 9 fin aluminum tubing.
- •9 DRIER—Low Size, ¾" diameter, 7 gram capacity.
- •10 COPPER CAPILLARY TUBING—.081" O.D. x .031" I.D. 5 ft. long.
- •11 ACCUMULATOR—Spun end—copper.
- 12 COMPRESSOR—$\frac{1}{5}$ h.p.—hermetically sealed.

★Parts produced and fabricated from seamless, non-ferrous tube by Wolverine Tube Division, Detroit.



Wolverine Trufin is available in a variety of fin heights, fin spacings and in copper and aluminum. Trufin can be fabricated as readily as plain tube—end connections can be made easily.

Let us send you our technical reports, E-6, on the use of finned tube.

WOLVERINE TUBE DIVISION
CALUMET AND HECLA CONSOLIDATED COPPER COMPANY
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MANUFACTURERS OF SEAMLESS NON-FERROUS TUBING
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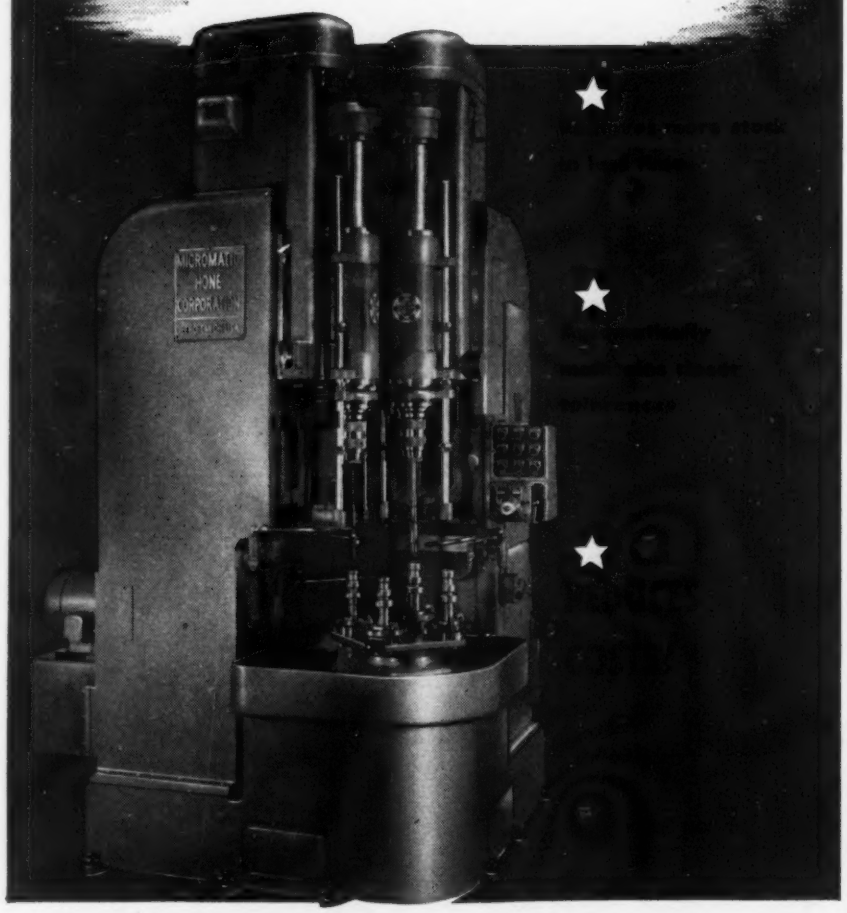
MEMO
Lets look into this
NEW
machine
for heavy-duty multiple
or progressive
MICROHONING



Micromatic now offers a new multiple spindle, unit constructed, Quill type machine with added power and control for removing more and more stock in less time from harder materials. Completely automatic, electronic control of uniform size within .0001 to .0003 inch in production.

Microhoning Machines, Tools, Fixtures and Abrasives

MICROMATIC HONE CORPORATION
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DISTRICT FIELD OFFICES:

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616 Empire Bldg., 206 S. Main St., Rockford, Ill.
55 George St., Brantford, Ont., Canada
Micromold Manufacturing Div., Boston Post Road, Guilford, Conn.

the most favorable cycle consists of making the work cathodic from 2 to 40 seconds and anodic for from ½ to 5 seconds. A typical cycle was described as having a 5 to 1 ratio. In this cycle, the loss due to the reverse current is 33-1/3 per cent. However, because it is possible to plate at a higher current density and a higher efficiency, the overall plating rate is not lowered, but is increased.

Magnet Plating—This fact was shown for a series of magnets, all plated to a thickness of 0.015-inch by various methods. Under barrel plating conditions, 7 hours were required. Still plating, under ordinary high speed copper plating conditions, required only 5 hours, but the appearance was pebbly. Using periodic reverse current plating these magnets were plated in the same type of copper solution to a thickness of 0.015-inch in 3½ to 4 hours. The deposit produced was smooth and free of crevices. It was also reported that other cyanide baths, such as silver, brass, cadmium zinc, gold and bronze, respond to periodic reverse current plating methods.

From the practical standpoint, current reversal is accomplished by two methods at the present time. First, by reversing the current at the tank and second, by reversing the field of the generator. Oscillograph curves indicate that greater losses are to be expected using field reversal because of slower decomposition and build-up to voltage, as against contactor operation. Experimentally, too, according to Dr. Foulke, denser deposits with greater leveling have been obtained using contactors.

Power Transmission and Piping—In presenting a paper prepared by G. L. Nankervis entitled, "Direct Current Power Transmission and Piping in the Modern Plating Room," W. E. Stadel, George L. Nankervis Co., Detroit, brought out the fact that a few of the recent demands placed upon piping requirements in modern plating establishments are proper air agitation, automatic spraying, precise temperature control, proper reclamation of rinses, and in many instances, the deionization of water. Considerable stress has been placed on adequate water for specific rinsing problems, and tank makeup, but by the same token, consideration must be given to the economy of water use.

It has been found that much smaller quantities of rinse water are necessary, to maintain a clean solution, if water is introduced into bottom of tank. In the case of water rinsing on full automatic equipment, it is generally advisable to use intermittently

operated sprays which are operated by remote control so as to function only when the rack is being lifted out of the rinse tank.

Insulation of Piping — When metallic pipe is used on electrified tanks, a dielectric insulation must be employed. In small size metal pipes it is necessary to select a good insulating joint. However, when pipes are large, flanged connections are generally employed, using rubber gaskets with bakelite bushings and washers. Expansion joints are also employed, particularly when the solution transferred has any degree of temperature range variation.

One of the engineering problems connected with piping which must be considered is the heating of solutions. The most generally accepted type of economical heating is either by coils or heat exchangers. In figuring the amount of heat necessary to properly raise the temperature of the various plating solutions, and to maintain them at proper temperatures, the following factors should be considered: 1. Heat up time allowed, 2. size and construction of the tank for heat loss to the atmosphere, 3. is the tank solution going to be heated with steam coils or pumped through heat exchangers?

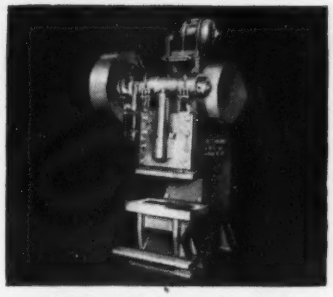
In all cases it is inadvisable to run steam condensate from any heated solution in the plating department, which contains chemicals harmful to boiler feed water, back to the steam generator source. With reference to heat exchangers, it was brought out by Stadel, that there are three generally accepted types:

Carbon type generally made from a special carbon material, such as Karbate, iron type and silicon-alloy type.

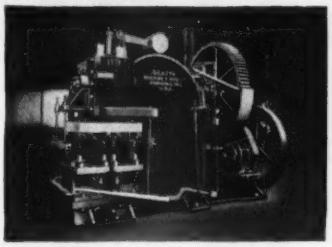
The iron type can be used in alkaline solutions only.

Recommended Types of Exchangers —Diagram in Fig. 1 shows a plate type heat exchanger made from carbon material by the National Carbon Co., New York, and recommended for use as a heater or cooler for pickling, etching, plating, cleaning or similar tank where frequent handling of the work in process is required and where the heating or cooling equipment is consequently subjected to mechanical shock. Shown in Fig. 2, is another type of heat exchanger, constructed of carbon material, by Heil Process Equipment Corp., Cleveland, which is used in bright nickel plating processes.

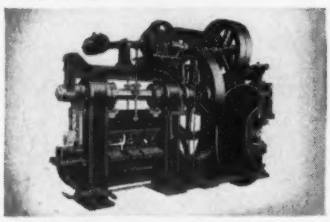
In discussing the possibility of using aluminum bus bars in plating systems, Mr. Stadel cited the following advantages of aluminum bus sys-



BEATTY Single End Punch available in capacities up to 200 ton.

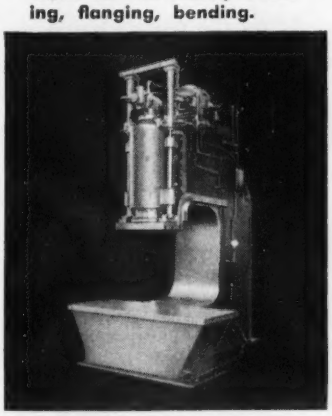


BEATTY No. 11-B Heavy Duty Punch for production tooling and use with BEATTY Spacing Table.

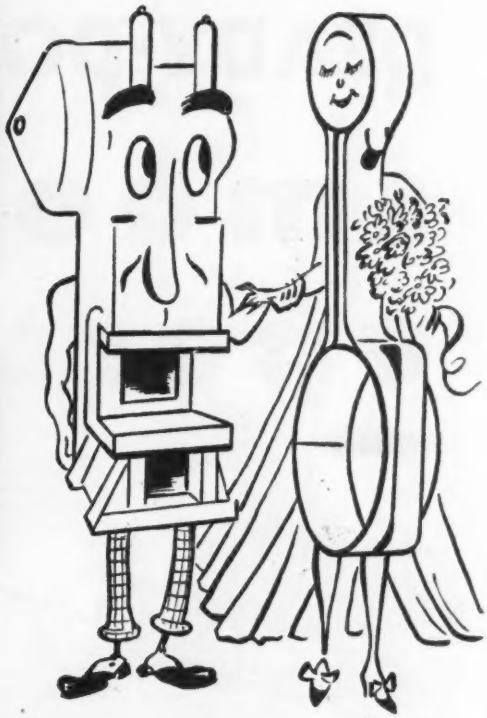


BEATTY Co-Pun-Shear — one unit does coping, punching, shearing.

BEATTY Horizontal Hydraulic Bulldozer for heavy forming, flanging, bending.



BEATTY 250-ton Gap Type Press for forming, bending, flanging, pressing.



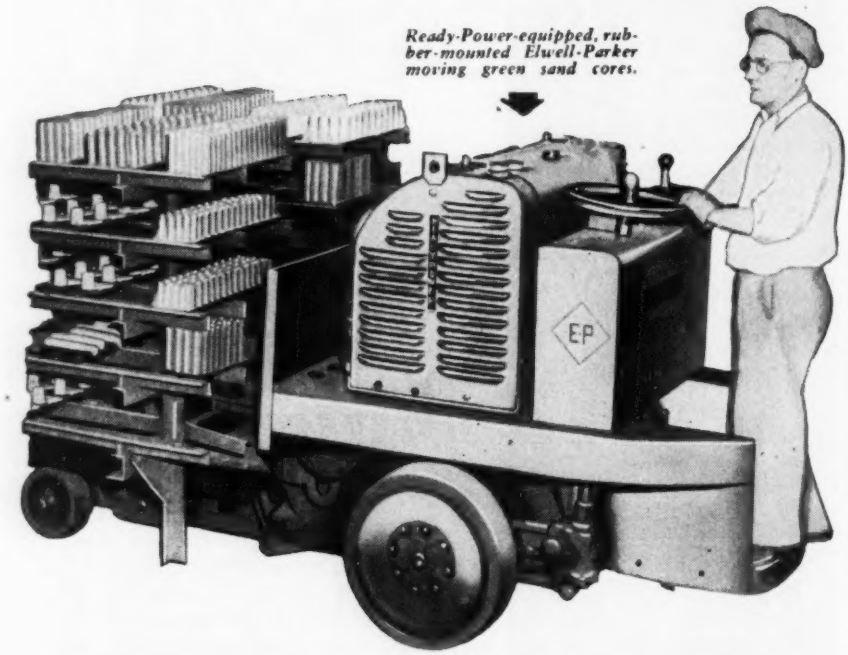
SHOTGUN WEDDING

Fast, low-cost production today demands machines correctly designed, correctly tooled for the specific job to be done. It *demands perfect mating* of machine to job, and this calls for the best engineering experience available to you. Here is where BEATTY ENGINEERING comes in. We know there is a BETTER way to do most production jobs. Our broad experience in finding that better way for so many companies is assurance that we can contribute to the solution of your problems. Write or phone us about your needs. Your best insurance for fast, quality production at a competitive cost is a BEATTY machine engineered to your specific needs.

HYDRAULIC HEAVY METAL WORKING EQUIPMENT

BEATTY MACHINE AND MFG. COMPANY
HAMMOND, INDIANA

READY-POWER for smooth operation



Ready-Power-equipped, rubber-mounted Elwell-Parker moving green sand cores.

If it's smooth, electric truck operation you want, there's nothing better than Ready-Power gas-electric Power Units. Ready-Power offers *more* than regular electric truck operation because dependable electric current is generated right on the truck chassis in unlimited amounts. That means trucks are always ready to operate at top efficiency . . . 'round the clock if necessary. Install Ready-Power Units on any make electric truck. Write for details.

Ready-Power-equipped Mercury truck loading an annealing oven.

THE READY-POWER CO.

3824 Grand River Ave., Detroit 8, Michigan

tems: 1. No tinning is required on aluminum bus bar installations, 2. punching of holes in aluminum bus bars is easy and affords clean holes, 3. an aluminum bus bar is easy to bend and fracturing is not likely to occur, 4. electricians can work easily with 20 foot lengths of aluminum bus bar, 5. in designing an aluminum bus bar installations ceiling hanger requirements are not very great.

Concerning the current carrying capacity of plating racks, Mr. Stadel brought out the fact that tests carried out by his company showed that the scale of 1000 amperes per square inch in designing plating racks is too conservative. He stated that 1500 amperes per square inch may be safely used, and 2000 amperes per square inch are within reason on some installations.

Press Safety Standards Revised in New Code

Complete revision has been made of the safety code for protection of employees using power presses and foot and hand presses by a committee organized under procedure of American Standards Association, New York, and sponsored by National Safety Council. Included with the code are acceptable recommendations for installation of power presses as well as a wide variety of guards and feeding methods.

Size of opening nearest nip point in fixed barrier guards has been lowered from 3/8 to 1/4-inch and a complete table of permissible openings is incorporated in the standard. Requirements for gate guards, two-hand tripping devices, pull-out guards, electronic safety devices and various other types of guards are included in the new edition. In addition, the appendix carries more complete descriptions and illustrations of guards and lists applications and limitations for each type.

High Speed Photography Developed for Industry

High speed camera for industrial use was developed recently by Eastman Kodak Co., Rochester, N. Y., and is described in a booklet containing examples of its application and enlargements from motion pictures taken at 1000 to 3000 frames per second. Many industrial uses of this camera are believed possible in applications where normal vision is too slow to see anything but a blur.

Flow of lubricants in a cutting operation can be observed to determine

Sandvik Precision Spring Steel *Starts at .001"*

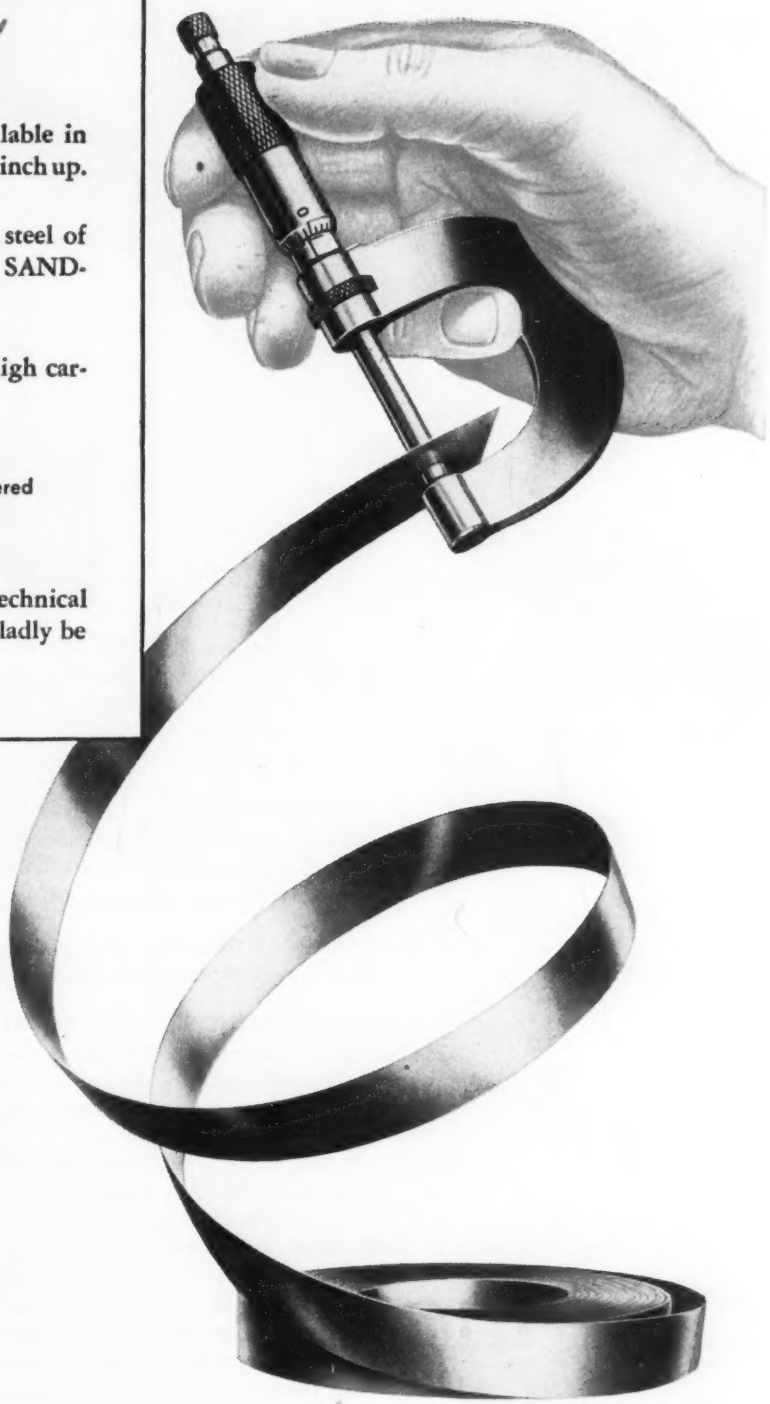
Sandvik high quality spring steel is available in thicknesses from one one-thousandth of an inch up.

When your requirements call for spring steel of accurate and uniform gauge remember SANDVIK'S precision-producing ability.

You can obtain SANDVIK cold-rolled, high carbon or alloyed strip steels:

- In special analyses for specific applications
- Annealed, unannealed or hardened and tempered
- With bright finish or blue or yellow polished
- With round edges or square edges

Complete information, stock lists and technical advice on specific steel applications will gladly be furnished, on request.



SOME SANDVIK SPECIALTY STRIP STEELS

Band Saw Steels · Camera Shutter Steel Clock and Watch Spring Steels · Compressor Valve Steel · Doctor Blade Steel Feeler Gauge Steel · Flapper Valve Steel · Knife Steels · Matrix Band Steel Needle Cutter Steel · Piston Ring Segment and Expander Steels · Razor Blade Steel · Reed Steel · Shim Steel · Shock Absorber Steel · Sinker Steel · Spring Steels · Textile Steels · Vibrator Reed Steel

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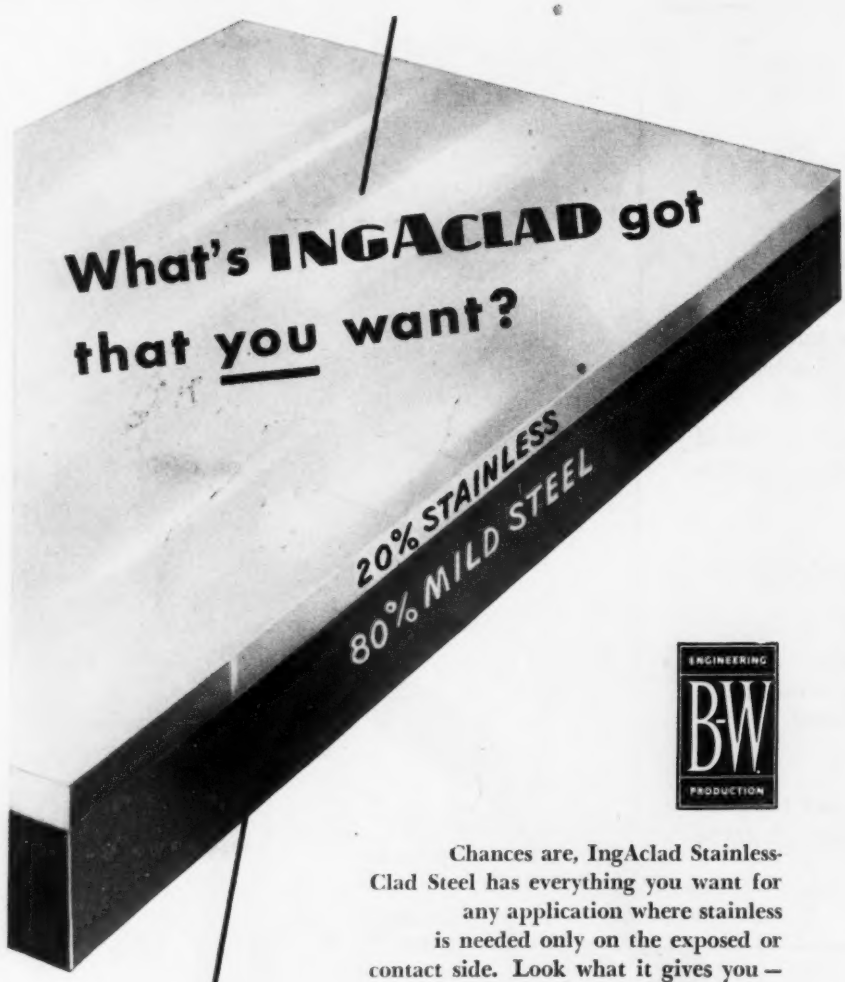


ENGINEERING B-W PRODUCTION

Chances are, IngAclad Stainless-Clad Steel has everything you want for any application where stainless is needed only on the exposed or contact side. Look what it gives you —

TOP PROTECTION on the stainless side. The 20% cladding of solid stainless means maximum resistance to rust, corrosion, abrasion, erosion.

EASY FABRICATION. The 80% backing of mild steel means easy workability.

VERSATILITY. Uses limited only by your own ingenuity. Already proved in scores of applications in dozens of industries.

ECONOMY. In first cost . . . in fabricating cost. If that's what you want — you want IngAclad. Why not investigate its possibilities now? Full details on request — no obligation. INGERSOLL Steel Division, Borg-Warner Corporation, 310 South Michigan Avenue, Chicago 4, Illinois. Plants: Chicago, Illinois; New Castle, Indiana; Kalamazoo, Michigan.

INGACLAD
STAINLESS-CLAD
STEEL

whether coolants do the necessary job in heat removal. Neither the naked eye nor still photography would supply the answer in many instances. Forging of incandescent metal and welding operations can also be studied by photography at high speeds and magnified projection at conventional speeds.

Preassembly Cuts Repair Time on Furnace Walls

Preassembling jambs and arches for open hearth front walls and banding them in units for transportation on cars to a furnace when needed at Carnegie-Illinois Steel Corp., Gary, Ind., saves 1 hour of installation time and gives 25 per cent longer front wall life. The method which was developed at the Gary works requires special attachments on charging cars for tearing out old front wall and installing pre-assembled units.

Water-cooled door-arch skewbacks have been installed at end doors of furnaces, eliminating necessity of repairing jambs and skewbacks at those locations. Dry joint is being built about 6 inches above sill line to serve as a shearing point when old front walls are torn out.

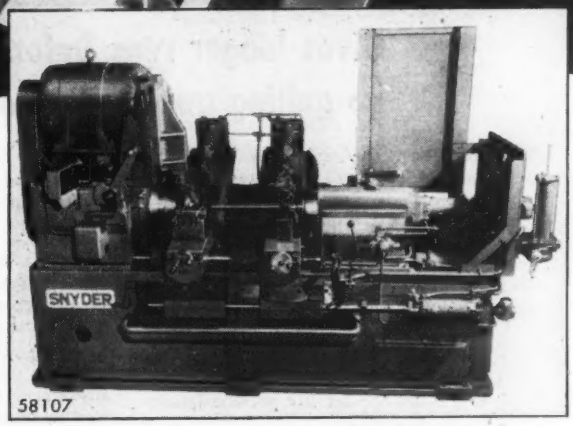
Charging buggy is used for transporting jambs, and a car equipped with a skewback frame serves as a jig for constructing door arches. The equipment consisting of a rack for installing arches and a supporting frame for handling jambs is designed to be handled by the peel of charging car. Special wedge-shaped tool is provided for pulling out old arches and removing old jambs.

Stress Study Results Reported in Bulletin

Report of an investigation conducted to determine whether or not the stress at which yielding starts in most stressed fibers of a steel member subjected to uni-axial stress which is distributed nonuniformly on a section of the member is larger than stress at which yielding starts in same material when uni-axial stress is distributed uniformly is contained in a bulletin published recently by Engineering Experiment Station, University of Illinois, Urbana, Ill.

Experimental results show that, except to a small degree in one specimen, stress required to start yielding in presence of a stress gradient was not higher than was required in a uniform stress field. Previous reported inconsistencies are attributed to two main factors: (a) Difficulties

Look ahead with Snyder!



AXLES will cost less because of this SNYDER LATHE

Nine and a half tons of rigidity, speed and accuracy, this special lathe, designed and built by Snyder, uses newest developments in clamped-on, round, triangle and other shaped carbide tools to turn out 75 to 80 pieces an hour at 80% efficiency.

As shown, the machine is tooled for turning and facing rear axle shafts and in one operation finishes all diameters and faces to size (except for grinding stock on the bearing and oil seal diameters). It also can be applied to a wide range of other parts with minimum change-over. Center drive unit and other attachments can be added any time.

All feeds are hydraulic, quickly adjustable by dials for each attachment. Spindle speeds are controlled by readily accessible pick-off gears. All moving parts are automatically lubricated. Work cycle is automatic.

Money saved through HIGHER production efficiency is clear profit. Maybe Snyder can help you. Write *Snyder Tool & Engineering Co., 3400 E. Lafayette, Detroit 7, Mich.*

SNYDER SPECIAL MACHINES CONTROL COSTS

23 Years of Successful Cooperation with Leading American Industries

SNYDER TOOL & ENGINEERING CO., DETROIT 7, MICH.

A new inter-metallic compound in Grade 24 Ampco Metal results in longer runs for drawing dies such as these — in most cases many times longer than steel dies — before re-dressing.
Die-hard
Ampco Metal Grade 24
cuts your drawing costs

Gives longer runs before re-dressing — no galling and loading on stainless steel

Here's the new Ampco Metal Alloy — Grade 24. It gives you more hardness and compressive strength than any other bronze — even more than Grade 22 Ampco Metal which you have used for your drawing and forming work in the past. Machinability of Grade 24 is about the same as that of Grade 22.

Dozens of disinterested shops have already tested this new alloy in die work. They *proved* that Grade 24 gives you 2 to 5 times the die life previously considered standard.

These tests also proved that Grade 24 Ampco Metal dies are superior to steel dies on many jobs, especially stainless steel. A typical test case showed a 77,000 run on an Ampco Metal die, compared to a 3000 run on a steel die. The Ampco Metal die does not seize or gall. There is less frequent need for re-dressing. As a result, you get longer runs at lower cost. Actual superiority varies according to die-tolerances and working stock.

Plan now to get more work per dollar from your dies. Use the longer-run advantages of Grade 24 Ampco Metal to avoid investment in more expensive carbide dies. See your nearby Ampco engineer today, for the complete cost-cutting story on Grade 24! Write for bulletins giving complete data today.

Ampco Metal, Inc.
Dept. S-6, Milwaukee 4, Wisconsin
Field Offices in Principal Cities

of determining load at which yielding started in most stressed fiber, and resulting erroneous interpretation of test data, and (b) varying stress levels at which an upper yield point phenomenon may be exhibited by some steels under different stress conditions.

X-Ray Movies to Help Industrial Research

Super-speed x-ray movies, known technically as high speed cineradiography, developed in lamp research laboratories of Westinghouse Electric Corp., Bloomfield, N. J., may solve many of the mysteries of how metal is deposited from an arc welding rod, and of how molten metal flows into a casting mold. As more powerful x-ray tubes are developed, it may even be possible to inspect externally the internal action of airplane and automobile engines which should result in smoother and safer engine performance.

Process teams up x-ray exposures of 10 millionths of a second and a shutterless camera shooting movies at 100 frames a second. Reaction which occurred when a mixture of iron oxide and aluminum, ingredients of wartime incendiaries, was ignited, was shown recently at a meeting of American Physical Society, Washington. Contrasted to a conventional movie which merely showed a shower of sparks, the x-ray technique revealed actual melting phenomenon inside the crucible as well as subsequent bursting of molten metal through a steel plate underneath.

Protects Flexible Shafts Transportation Tubing

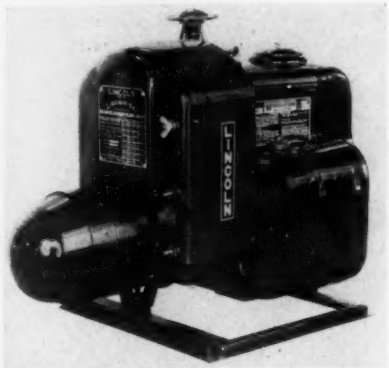
Some of the advantages of a new method of packing and shipping armored flexible shafts manufactured by Wyzenbeek & Staff Inc., Chicago, are protection in transportation and handling, cleanliness and instant identification. Each shaft is now individually encased, lengthwise, in strong transportation tubing and sealed in by metal cap at each end.

Tubes are provided for each size of shaft which keep them straight and safe from impact during handling and shipment. Shafts remain in their tubes, protected from shop dust and dirt when stored on racks, and can be taken out easily when needed for use. Since each tube is clearly labeled with name, catalog number and other essential data for quick information, getting the right shaft for the job is made easier.

New Products and Equipment

Light Weight Welder

Light in weight, the gasoline engine-driven type Lincwelder, made by Lincoln Electric Co., Cleveland 1, O., is an inexpensive yet complete unit with a current range of from 20 to 180 amperes. Of compact design, measuring 2 x 2 x 4 feet, the machine can be used for the welding of



light or heavy gage metal, the repair of cast iron structures, etc.

Provision is made on the output panel for three ranges of output current, continuous adjustment within the ranges being obtained by a speed control. Generator controls are inside and enclosed cabinet above the generator. Power is supplied by a Wisconsin air-cooled 2-cylinder engine. Mounting rails for bolting to floor or platform permit the welder to be mounted on either shop trailer or road type two-wheel trailer.

Check No. 1 on Reply Card for more Details

Hydraulic Power Unit

Baker Brothers Inc., 1000 Post St., Toledo, O., is producing a completely separate mobile hydraulic pump and

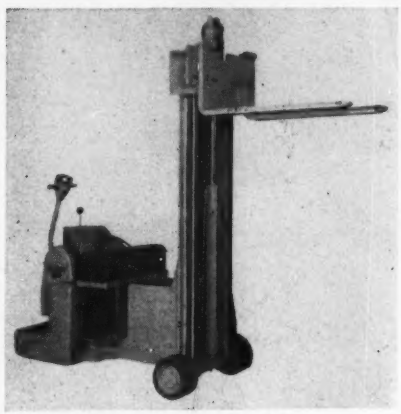
tank unit for use with several new hydraulic feed way type units. Caster-mounted unit has advantage of exchangeability of units and smoother machine operation when mounted outside of machine base.

Unit is attached to operating cylinder of machines by high pressure hose lines joined with self-sealing couplings that permit breaking the line without the influx of air into the system. The pump uses the new Oilgear model JK10203 variable delivery feed pump of the positive displacement, radial piston type.

Check No. 2 on Reply Card for more Details

Hand Fork Truck

Automatically cradling all loads at carrying position, the automatic tilt is standard equipment on the improved suspended fork model Transtacker, built by Automatic Transportation Co., 149 West 87th St., Chi-



cago 20, Ill. The tilt operates through a vertical cam bolted to the lower front of the truck's mast.

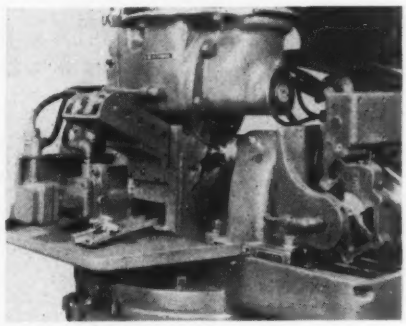
Other improvements include a non-skid drive tire, better distribution of weight, increase of road clearance to 4-5/8 inches, better vision through shorter truck length and easier operation because of repositioning of hydraulic release lever and new push-button controls. Hydraulic lift motor and pump are a direct-connected integral unit. Capacity of Transtacker is 2500 pounds for a 36-inch load or 2000 pounds for a 48-inch load. Lifting height of forks is 64 inches. Overall height is 79 inches.

Check No. 3 on Reply Card for more Details

Shaving Machine Loader

An automatic loading mechanism, developed by National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich., for its model GCV and GCU Red Wing diagonal gear shaving machines, enables the machines to run continuously as long as the magazines are supplied with work gears. One operator, not a skilled machinist, can keep a battery of the machines filled and in continuous production. Work gears are supplied to air operated loader by gravity.

Head and tailstocks are also air operated, designed so that they will remain positively locked in case of air line failure. Time for loading and unloading of a gear is 2.3 seconds. Shaving time depends upon the par-



ticular gear and the amount of stock to be removed. That is predetermined and the machine set for the amount of shaving time required.

Check No. 4 on Reply Card for more Details

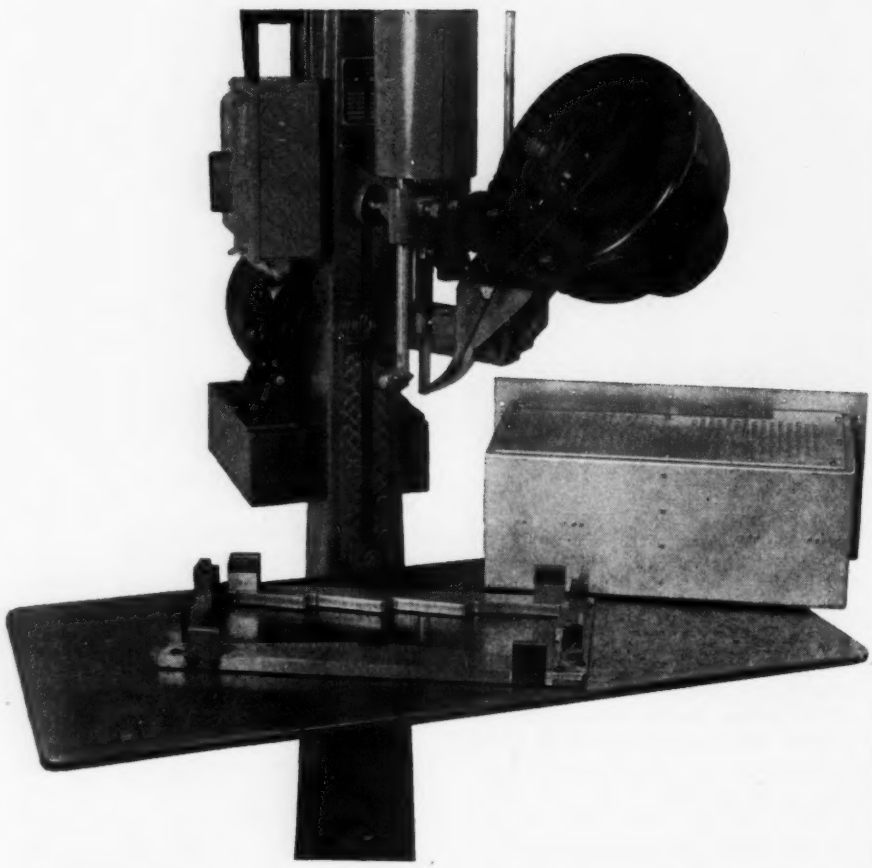
Electric Lift Truck

Driver of the rider-controlled electric lift truck, the Load-Mobile, made by Market Forge Co., 25 Garvey St., Everett, Mass., may handle it in any one of three ways: For short hauls, where he must be on and off quickly, a folding step is provided; when it is convenient to either face the load or away from the load, he may place the swivel seat in the desired position. Truck has two speeds, chosen by foot

pedal which is of the "dead man" type, applying the brake when foot pressure is removed.

Unit is available in two models, of 3000 and 5000 pound capacities, both with 20 per cent overload capacity. Speeds of the two models are 3.5 and 3.0 miles per hour, respectively. Both are offered in all lengths from 36 inches (length of platform) to 72 inches. All are 26 inches wide.

SELF-TAPPING SCREWS
• NO PROBLEM •
with
DETROIT POWER SCREWDRIVERS



Driving self-tapping screws presents a problem which is easily overcome by the use of Detroit Power Screwdrivers. Ten screws on each side of cabinet, as illustrated, are driven by the assistance of fixture mounted on steel balls, providing for ease of locating screw holes by means of a pin in center of table aligned with the fingers on the machine. This affords an easy way for the operator to slide the complete assembly from notch to notch in the fixture.

Screw-driving time per screw one second. Complete assembly is made in 55 seconds.

Send Sample Assemblies for Estimates and Catalog

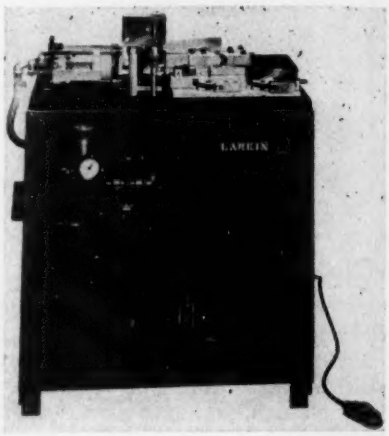
DETROIT POWER SCREWDRIVER CO. 2811 W. Fort Street DETROIT 16, MICH.

Heights are the standard lift truck heights of 6, 7, 9 and 11 inches with a full lift of 4 inches. Detachable power unit can be attached to practically any other load carrying truck of suitable dimensions and capacity.

Check No. 5 on Reply Card for more Details

Butt Welder

End to end welding of round and rectangular stock is possible with the high speed air operated butt welders introduced by Larkin Lectro Products Co., 160 West 146th St., New York 30, N. Y. Unit features automatic control or welding jaws, upset



pressure and has five heat controls for different types of work.

Dies are interchangeable and can be designed for end to end welding of wheel rims, hoops, squares and various other contours of metal. High speed air-actuated welding jigs guarantee production rates as high as 20 welds per minute. Model BA-10 (illustrated) is of 10 kilovolt-amperes capacity and is suitable for round stock up to 3/8-inch in diameter, or its equivalent in flat and rectangular material. Machines are offered in capacities from 10 to 75 kilovolt-amperes and in hand operated models from 10 to 30 kilovolt-amperes.

Check No. 6 on Reply Card for more Details

Collapsible Taps

Landis Machine Co., Waynesboro, Pa., is announcing style LL receding chaser collapsible taps for tapping tapered threads. They are adjustable for thread length and can be use for American tapered pipe threads or for any line pipe, tubing, casing or drill pipe threads listed in API standards if the threads are within the diametrical capacity of the taps. All operating parts are made of steel.

Receding action of the chasers is accomplished through a fulcrumed lever principle. Collapsing action

"Standard"
Tubing
Techniques
Automobile Propeller Shafts
Demand a Tube that Won't Fail!
"Standard" electric weld tube is made to precision tolerances of gauge, diameter, ovality and straightness which gives almost perfect balance at high R.P.M. Made from high strength steel, every piece is hydro-tested to within 10% of the elastic limit of the steel assuring dependability and safety in operation. For expert workmanship and requirements that demand a tube of exacting specifications—
Specify "STANDARD"—it pays!
Sizes ½" O.D. to 5½" O.D., 22 B.W.G. to 3 B.W.G.
THE STANDARD TUBE CO.
Detroit 28, Michigan
Welded Tubing
Fabricated Parts
STANDARDIZE with STANDARD — It Pays

MATERIALS-HANDLING EQUIPMENT

CUTS OPERATING COSTS . . . SPEEDS OUTPUT

KRANE KAR performance is unmatched. Works anywhere — in the plant or yard — tight quarters, low headroom, long hauls, up and down grades. Makes short work of Loading and Unloading freight cars, trucks, trailers . . . Transporting, Stacking, Storing . . . Plant Maintenance and Repairs. Ideal for handling forgings, bars, blooms, billets, ingots, castings, (or scrap when equipped with magnet). Also heavy objects like transmission cases, machine heads, crankcases, motors, etc. Users report labor-savings up to 75% . . . materials handling costs cut to 8c a ton . . . and elimination of hazard of serious injuries commonly experienced in hand methods.*

Gasoline or Diesel. Equipped with pneumatic or solid rubber tires; 9 to 37 ft. booms or adjustable telescopic booms; electric magnet, clamshell bucket, and other accessories available.

USERS: General Motors; Bethlehem Steel; Todd Shipyards; Boeing; General Electric; duPont; Pullman Standard; etc.

* Case studies on request.

KRANE KAR handles loads at Sides as well as at Front.

Ask for illustrated Bulletin No. 79.

THE ORIGINAL SWING-BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

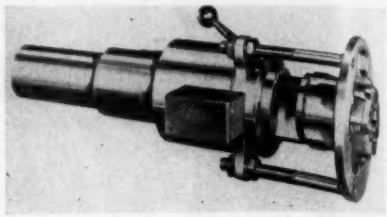
1¼, 2½, 5, AND 10 TON CAPACITIES

KRANE KAR

TRADE MARK REGISTERED

SILENT HOIST & CRANE CO., 849 63rd ST., BKLYN 20, N.Y.

causes the chasers to drop into the tap head at the completion of the thread, thus freeing the chasers from the work and permitting the direct removal of the tap without "backing out." A detachable head permits use of tap heads of various sizes and ca-

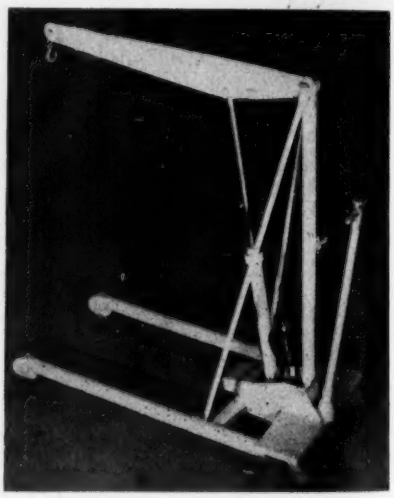


pacities on the same tap body. In the 3 to 12-inch sized heads an even number of chasers is used, irregularly spaced in the head circumference. No two chasers are directly opposite each other.

Check No. 7 on Reply Card for more Details

Portable Floor Crane

Manzel Inc., Buffalo, N. Y., is manufacturing a portable floor crane for many uses, including motor installation, machine repair, drum storage,



materials handling, etc. Its two widespread rear caster and two large diameter front wheels are mounted directly on the frame to give four-point stability. The guiding handle is rigidly attached to the base. It also serves as the pumping lever.

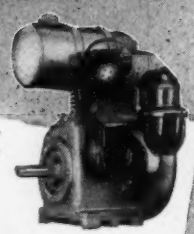
Mast is supported by heavy braces reaching from the base to the top of the crane. Booms of various lengths and styles are interchangeable to fit load requirements. Twin pumping cylinders give fast and easy action from initial position to point of contact. As load is contacted, the power cylinder automatically takes over. Dual valve controls on handle and mast permit load to be accurately

Increase The PRODUCTIVE CAPACITY of Your Mechanized Equipment with WISCONSIN *Air-Cooled* ENGINES

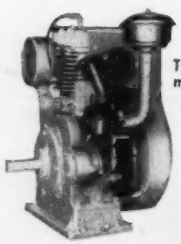
If you build or use any kind of equipment that *is* or that CAN be successfully engine-powered — there is a fairly definite certainty that you can actually increase the productive capacity of the machine by motorizing with a Wisconsin Air-Cooled Engine.

This rather broad statement is predicated on the fact that Wisconsin Engines are notable for continuous, high ratio power output as well as an absolute minimum of maintenance and servicing layups. In addition to the basic advantages of air-cooling, light weight, compact design and all-weather serviceability—you are assured of "Most H.P. Hours" of on-the-job operation, thanks to advanced engineering and heavy-duty design and construction.

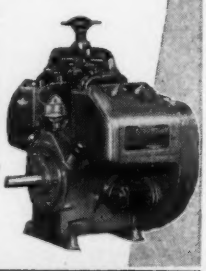
Wisconsin Engines are worth looking into on all counts. Your interest will be heartily reciprocated.



Typical 4-cycle single cylinder model, 2 to 4 Hp.



Typical single cyl. model, 4 to 9 Hp.



Typical V-type 4-cylinder model, 15 to 30 Hp.

WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 14, WISCONSIN

More used than any other Merchant PIG IRON

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INDUSTRY'S FIRST COMPLETELY
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WELDING GUNS

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Interchangeable air or hydraulic cylinders
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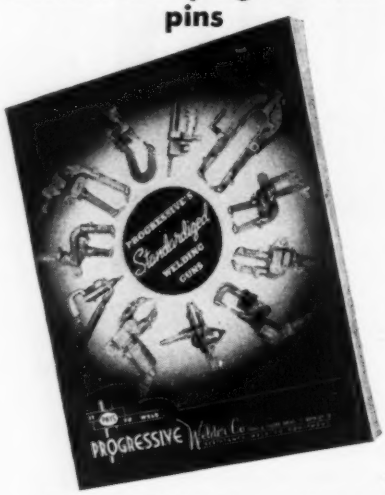
Standardized chassis, optional cable connections, standardized switches, current carrying fulcrum pins



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BULLETIN NO. 402

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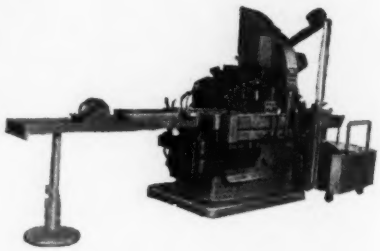
PROGRESSIVE
WELDER COMPANY
3050 E. OUTER DRIVE, DETROIT 12, U.S.A.

lowered into place from any convenient working position.

Check No. 8 on Reply Card for more Details

Abrasive Cutting Machine

A fully automatic abrasive cutting machine with an oscillating head which will cut materials up to 6 inches in diameter (solid stock) is the model 470, designed by Andrew C. Campbell Division, American Chain & Cable Co. Inc., Bridgeport 2, Conn. It is sequence timed and, regardless of size of stock being cut or length of



feed, no timing cycle adjustment is required. Stock feed, clamping, adjustment for wheel wear, ejection of cut pieces and stop after final cut are entirely automatic.

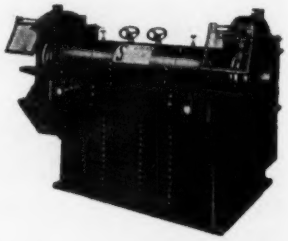
While wheel is cutting through the work, the feed carriage is being returned to starting position. At completion of cut wheel is raised to "up" position and work clamps are raised clear of work. At the same time clamp of feed carriage is moved to right against its stop. Bar clamp is released, work clamp moves downward and clamps bar into V-block and the abrasive wheel is started downward and the cycle repeated. A coolant system helps the machine smooth as it cuts. Semiautomatic model 460 is also made.

Check No. 9 on Reply Card for more Details

Snagging Grinder

Redesigned No. 35 twin motor infinitely variable speed snagging grinder, designed by Standard Electrical Tool Co., 2405 River Rd., Cincinnati 4, O., allows each operator to be entirely independent of the other. Machine has two spindles, 7½-horsepower motors, magnetic starters, start-stop pushbutton stations, shaft locks for use in changing wheels, infinitely variable speed drives and hand wheel speed controls.

Interlocking arrangements prevent over speeding of the grinding wheels. Full diameter wheels cannot be mounted until the hand wheel speed control has been reversed to its original position. Ball bearings are protected in large size oil reservoirs with labyrinth seals and sight feed oil gages. Wheel guards have hinged



doors and are adjustable to wheel wear. The 4 x 9-inch work rests are adjustable and removable.

Check No. 10 on Reply Card for more Details

Shop Crane

Cardinal Corp., St. Paul, Minn., is announcing the Hydro-Lift 2000-pound capacity shop crane with a 45-inch boom. If a greater boom length is desired, an 18-inch extension may be attached. Locator pin locks boom in the proper working position. A double acting hydraulic pump con-

verts movement of pump handle into lift motion.

Loads are held at any height. Leakproof neoprene oil seals resist corrosion. Crane is fabricated of formed steel, its frame providing a stable platform for heavy loads. Three rubber tired roller bearing wheels permit easy load movement. Placing of towing handle in upright position automatically sets brake.

Check No. 11 on Reply Card for more Details

Indexing Turntable

Induction soldering, brazing or heat treating operations may be performed on the indexing turntable developed by Sherman Industrial Electronics Co., 505 Washington Ave., Belleville 9, N. J. Work pieces are placed either manually or automatically on work holders and all operations there-

after are electrically and air controlled. As many as 12 work stations can be provided on the standard turntable top. Special holding

jigs are available or may be made by the user.

Heating time of 1 to 60 seconds is controlled by an adjustable electric timer. Limit switches and electric air valves insure proper sequence of operation. Air pressure regulator, oiler and filter are part of the unit. Also available are modified forms of the unit, including nonindexing turntable for continuous travel of work pieces through tunnel type coils and jet quench attachments. Operation requires 60 pound air pressure and 220 volt, 60 cycle, single-phase power.

Check No. 12 on Reply Card for more Details

Oscillating Conveyor

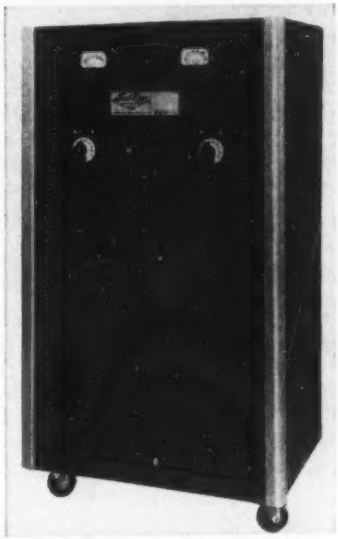
Handling of a wide variety of materials in a horizontal path is possible with the PA positive-action oscillating trough conveyor and feeder, developed by Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill. It is a roller bearing, eccentric type oscillating unit, driven by the company's Electrofluid drive through a chain or V-belt reduction to its eccentric shaft and connecting rod assembly. Unit is available in standard trough widths of 12 to 48 inches and in single trough lengths of up to 100 feet.

Oscillator may also serve as a cooler, dryer or conditioning unit when jacketed, louvered or otherwise constructed for the service intended. Trough is supported on a series of short arms and adjustable torsion bars and may be constructed in a variety of styles and of corrosion and heat resistant metals.

Check No. 13 on Reply Card for more Details

Selenium Rectifier

Requirements up to 2500 amperes with varying voltages from 1 to 9



volts are fulfilled by the style 2509 selenium rectifier, built by Bart-Mes-

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HI-GRADE METALLIC SHOT AND GRIT

FAMOUS
FOR ITS ABILITY TO STAND UP UNDER REPEATED HARD USE

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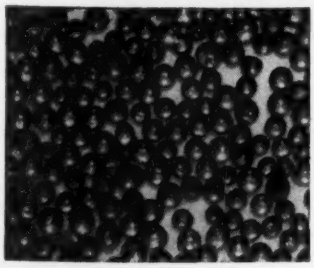
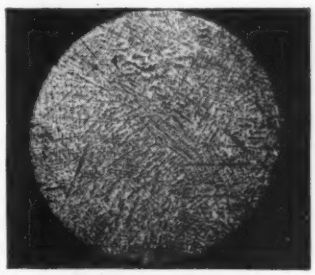


UNRETOUCHED PHOTO OF HI-GRADE SHOT

CLAYTON-SHERMAN ABRASIVES COMPANY
3896 LONYO ROAD
DETROIT 10, MICHIGAN
CEdar 7200



MICROSCOPIC STRUCTURE OF METAL

sing Corp., 45 Morgan Ave., Brooklyn 6, N. Y. Suited for chromium, bright nickel and acid copper plating as well as electrocleaning and electropolishing the unit has full load efficiency of 72 per cent. Continuous plating control permits changing tap switch positions without plating interruption.

Selenium stacks have 310 square inches of rectifying area per 100 amperes. Its quiet fan requires no external voltage for operation. Features include primary adjustment taps to compensate for abnormal line voltages, large Weston meters and shunt, availability of remote control, automatic shut off of rectifier if air intake is blocked and 60 positions of output adjustment. Input is 200-220-440 volts.

Check No. 14 on Reply Card for more Details

Skid Dump Unit

Model SRF-½ Phil-Dump Junior unit, made by Phillips Mine & Mill Supply Co., 2227 Jane St., Pittsburgh 3, Pa., hauls and dumps a variety of

industrial materials, including scrap, castings, stampings, sand, powdered chemicals, etc. With overall dimensions of 48 x 28 x 38 inches, the improved model can be either hand pushed or used with a fork lift truck.

Capacity of the unit is ½-cubic yard. Special processed tires afford floor protection and contribute to economy of operation.

Check No. 15 on Reply Card for more Details

Milling Cutter

Solid triangular carbide inserts which can be quickly and accurately adjusted or substituted in the cutter head while in milling position on the machine are incorporated in the design of the new milling cutter announced by Diamond-Detroit Inc., Detroit, Mich. When blade becomes dull, it is turned to the next triangular cutting edge. When all three have been used, blade is reversed, providing three more cutting edges.

Accuracy of resetting in the holder is achieved by bringing the blades up snugly against a stop pin. Worn or dull tools can be resharpened by squaring the ends on an off-hand grinder, setting both the table and protractor at zero.

Check No. 16 on Reply Card for more Details

• • •

THREE-WAY VALVE: Air, water and light oils may be handled by the fast-acting, three-way pilot-actuated solenoid controlled valve made in sizes from ¼ to 1¼-inches by Crescent Valve Co., Huntington Park, Calif. Designated as model 1030, the cast bronze valves are designed for pressures from 25 to 140 pounds per square inch. Plugging the exhaust port converts them to shut-off valves.

Check No. 17 on Reply Card ofr more Details

EMBOSSED ROOFING: Corrugated aluminum sheet for roofing, siding and other structural uses is being given added rigidity by an embossed finish, according to Reynolds Metals Co., Louisville, Ky. Glare is reduced and nailing characteristics bettered by the new product, offered in two thicknesses, 26 inches wide and in 6, 8, 10 and 12 foot lengths.

Check No. 18 on Reply Card for more Details

SMALL DRAFT GAGE: Visi-Draft transparent draft gages, made by F. W. Dwyer Mfg. Co., Chicago 12, Ill., have a circular spirit level built into the body. With the gage accurate draft measurements for setting draft controls may be obtained. Lining up of burners and control valves into level operating position is also possible.

Check No. 19 on Reply Card for more Details

NONSTAINING GERMICIDE: Twenty-five times more powerful than carbolic acid, a noncorrosive, nonstaining germicide, made by Willson Products Inc., Reading, Pa., also acts as a deodorant and fungicide. It may be used as a spray, swabbing solution or immersion solution for goggles, welder's masks, shoes, or any washable apparel. It is effective in either hot or cold water.

Check No. 20 on Reply Card for more Details

CARBIDE TOOLS: Wesson Co., Ferndale 20, Mich., is manufacturing three new carbide turning and milling tools. Round, square and triangular Wessonmetal inserts are supplied for the turning tools and may be rotated without removing the holder, offered in various sizes. Rigidcut face milling cutters have dovetail slot which receives taper blade with serrated wedge underneath. One blade size is used for all cutters from 4 to 36 inches. Varicut side milling cutter for side, straddle or slot milling may be adapted for these uses by different shaped blades. Widths from 3 to 8 inches and widths of ¼ to ¾-inches are made.

Check No. 21 on Reply Card for more Details

FRICTION CLUTCHES: Morse-Rockford Sales Division of Morse Chain Co., Detroit 8, Mich., is offering toggle type, over-center friction clutches for various industrial uses. Capacities ranging from 0.5 to 1.7 horsepower per 100 revolutions per minute are available. Toggles are factory assembled with release mechanism and adjusting plate.

Check No. 22 on Reply Card for more Details

VERSATILE HAND TRUCK: General Scientific Equipment Co., Philadelphia 32, Pa., is making a riveted, welded and bolted construction safety hand truck with two carrying positions. In open position it moves carboys, acetylene tanks, etc. in a vertical position. In closed position it will move, boxes, barrels, etc., in the conventional manner.

Check No. 23 on Reply Card for more Details

WIRE STRIPPER: Common sizes of machine screws are cut and electric wire is cut and stripped by a triple-purpose hand tool, the Shearite, made by Aircraft-Marine Products Inc., Harrisburg, Pa. Screws most used in electrical work, sizes 10-32, 8-32, 6-32 and 4-40, are cut without damage to threads.

Check No. 24 on Reply Card for more Details

FILTER PRESS: For use in general chemical plants and in the paint and lacquer fields, the Chemequip test press, designed by Chemequip Co., Newark 8, N. J., can be used to determine filtering properties of various solutions or slurries and for clarifying. Easily set up device has 98 square inches of filtering surface.

Check No. 25 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL PRICES— Downward trend in steel prices appears to have run its course. In fact, concern is rising over the industry's ability to hold present levels in face of rising costs. Producers who recently effected reductions are adhering to their new schedules, but makers who have made no revisions are showing no indications that they will effect reductions. As a matter of fact, some have made it clear they contemplate no action at this time. As a result a singularly mixed price situation prevails.

PRICE COMPOSITES— STEEL's preliminary weighted price composite on finished steel eased to 3.59799c for May from 3.63079c for April and compared with the final March figure of 3.63079c. The arithmetical price composites held unchanged last week and compared with those for the like 1947 week as follows: Finished steel, $80.27 and $69.82; semifinished steel, $68.62 and $52.10; steelmaking pig iron, $40.12 and $32.49; steelmaking scrap, $40.67 and $30.08.

BASING POINT— Uncertainty is mounting with respect to future steel pricing policies. Changes in customer-producer relationships on a wide scale are forecast in event multiple basing point pricing is banned. Wholesale removal of metalworking plants to sites closer to steel supply is predicted with resulting serious economic dislocations. Some hope is held out the basing point system can be continued in steel since the Federal Trade Commission views legality of the system on individual merits of each particular case. In other words, the Supreme Court decision in the Cement industry does not necessarily apply in steel. Meanwhile, there is every indication the steel industry will carry the issue through the highest courts for a decision.

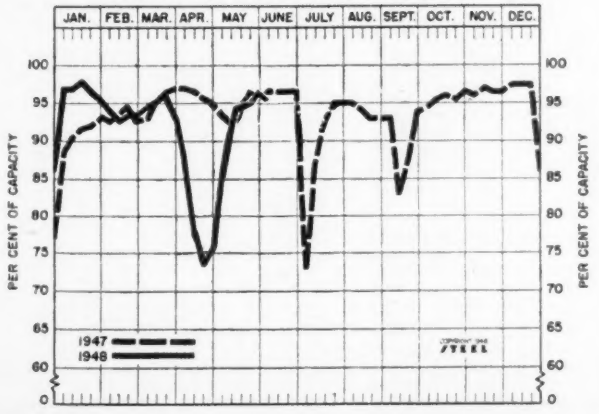
PRODUCTION COSTS— Recent automotive wage increases and pending wage negotiations in coal suggest the possibility of further inflation of steelmaking costs. Higher coal prices would be immediately reflected in pig iron costs. In this latter connection, a Pittsburgh producer last week upped its pig iron prices $3 per ton, following similar action by an eastern and two southern producers earlier in May. With costs where they are and steel wages up more than living costs since prior to the war, steel producers show no disposition to reopen wage negotiations. However, whether they can resist another round of increases indefinitely remains to be seen. Some labor trouble has been experienced at the mills recently and more is expected, especially in the way of slowdowns.

SUPPLY—With the third quarter drawing near, consumer quotas of finished steel for that period have been fairly well established. Pressure of demand is heavier and there is little prospect of any increase in supply. Even though European aid and rearmament demands are not likely to be felt much before fourth quarter, and the proposed allocation for the petroleum industry will not have much effect on shipments before then, output of finished steel will continue to fall considerably short of domestic requirements. Mass vacations in manufacturing plants may permit accumulation of inventories but no real relief from the shortage is in sight. Consequently, pressure for mandatory government allocation is likely to increase over the summer.

PRODUCTION OUTLOOK—Major point of uncertainty with respect to summer steel operations lies in coal labor contract negotiations. It is generally expected the miners will take two weeks vacation beginning late this month. If the mining suspension is extended into a strike beyond the two weeks steel mill operating schedules will be drastically affected and, in turn, deliveries from the steel mills to consumers.

OPERATIONS— Steelmaking operations continued to hold at a high rate last week, the national ingot rate easing only ½ point to 95.5 per cent of capacity, equivalent to slightly more than 1,720,000 tons.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended June 5	Change	Same Week 1947	Same Week 1946
Pittsburgh	95	— 1	101.5	40
Chicago	96	+ 2	96	61
Eastern Pa.	89	— 1	93	57
Youngstown	103	None	93	30
Wheeling	89	— 8	89	65
Cleveland	94.5	— 2.5	96	72
Buffalo	93	None	88.5	79
Birmingham	100	None	99	54
New England	78	None	95	80
Cincinnati	100	— 2	85	82
St. Louis	89.5	+ 4.5	82	54.5
Detroit	100	None	90	79
Estimated national rate	95.5	— 0.5	96.5	55

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 tons for 1946.

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COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	June 5	May 29	Month Ago May 1948	Year Ago June 1947	5 Years Ago June 1943
Finished Steel	$80.27	$80.27	$80.27	$69.82	$56.73
Semifinished Steel	68.62	68.62	68.62	52.10	36.00
Steelmaking Pig Iron	40.12	40.12	39.66	32.49	23.00
Steelmaking Scrap	40.67	40.67	40.67	32.48	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

May 1948	3.59799c
Apr. 1948	3.63079c
May 1947	3.11584c
May 1943	2.44941c

***STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide base prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (re-rolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading basing points), and on Steelworks Scrap (No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

†**FINISHED STEEL WEIGHTED COMPOSITE:** Computed in cents per pound, base prices, weighted by actual monthly shipments of following products, representing 82 per cent of total steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. April and May figures are preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton; others dollars per gross ton.

Finished Materials

	June 5 1948	May 1948	Mar. 1948	June 1947
Steel bars, Pittsburgh	2.875c	2.875c	2.90c	2.60c
Steel bars, del. Philadelphia	3.365	3.365	3.356	2.98
Steel bars, Chicago	2.875	2.875	2.90	2.60
Shapes, Pittsburgh	2.775	2.775	2.80	2.50
Shapes, del. Philadelphia	2.98	2.98	2.968	2.64
Shapes, Chicago	2.775	2.775	2.80	2.50
Plates, Pittsburgh	2.925	2.925	2.95	2.65
Plates, del. Philadelphia	3.21	3.21	3.19	2.85
Plates, Chicago	2.925	2.925	2.95	2.65
Sheets, hot-rolled, Pittsburgh	2.775	2.775	2.80	2.50
Sheets, cold-rolled, Pittsburgh	3.50	3.50	3.55	3.20
Sheets, No. 10 galv., Pittsburgh	3.90	3.90	3.95	3.55
Sheets, hot-rolled, Gary	2.775	2.775	2.80	2.50
Sheets, cold-rolled, Gary	3.50	3.50	3.55	3.20
Sheets, No. 10 galv., Gary	3.90	3.90	3.95	3.55
Strip, hot-rolled, Pittsburgh	3.05	3.05	3.05	2.50
Strip, cold-rolled, Pittsburgh	3.775	3.775	3.80	3.20
Bright basic, bess. wire, Pittsburgh	3.725	3.725	3.775	3.425
Wire nails, Pittsburgh	5.125	5.125	5.20	4.125
Tin plate, per base box, Pittsburgh	$6.60	$6.60	$6.70	$5.75

Semifinished

Sheet bars, Pittsburgh, Chicago	$60.00	$60.00	$60.00	$44.64
Slabs, Pittsburgh, Chicago	45.00	45.00	45.00	37.50
Rerolling billets, Pittsburgh	45.00	45.00	45.00	37.50
Wire rod 7/32 to 1/4-inch, Pitts.	3.175c	3.175c	3.175c	2.55c

Pig Iron

	June 5 1948	May 1948	Mar. 1948	June 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$44.08	$41.038	$40.996	$34.83
Basic, Valley	39.00	39.00	39.00	33.00
Basic, eastern del. Philadelphia	42.17	42.17	42.004	35.52
No. 2 fdry., del. Pgh. (N.&S. sides)	43.58	40.538	40.496	34.33
No. 2 fdry., del. Philadelphia	42.67	42.67	42.504	36.02
No. 2 foundry, Chicago	39.00	39.00	39.00	33.00
No. 2 foundry, Valley	39.50	39.50	39.50	33.50
Southern No. 2, Birmingham	39.38	38.63	37.88	29.88
Southern No. 2, del. Cincinnati	45.09	43.90	41.857	34.75
Malleable, Valley	39.50	29.50	39.50	33.50
Malleable, Chicago	39.50	39.50	39.50	33.50
Charcoal, low phos., fob Lyles, Tenn.	58.00	56.50	55.00	40.50
Ferromanganese, fob cars, Pittsburgh	151.00	151.00	151.00	140.25

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$40.25	$40.25	$40.25	$32.44
Heavy melt. steel, No. 2, E. Pa.	39.00	39.00	39.00	33.38
Heavy melt. steel, No. 1 Chicago	39.25	39.25	38.875	30.75
Heavy melt. steel, No. 1, Valley	40.25	40.25	40.25	34.06
Heavy melt. steel, No. 1, Cleveland	39.75	39.75	39.75	32.38
Heavy melt. steel, No. 1, Buffalo	43.00	43.00	44.00	32.00
Rails for rerolling, Chicago	52.50	51.75	49.625	38.75
No. 1 cast, Chicago	69.00	66.00	66.00	39.50

Coke

Connellsville, beehive furnace	$13.00	$12.94	$12.50	$9.56
Connellsville, beehive foundry	15.125	15.06	14.875	10.75
Chicago, oven foundry, del.	20.75	20.75	19.25	16.10

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $90-$95 per gross ton. Forging quality $46 per net ton, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56 per gross ton.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Buffalo, Birmingham, $45 per net ton; Cleveland, $47 per net ton; sales by smaller interests on negotiated basis at $85 per gross ton, or higher.

Forging Quality Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $54 per net ton.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66 per gross ton.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Youngstown, $60 nom., per net ton; sales in open market $95-$105 per gross ton.

Skelp: Pittsburgh, 2.85-2.90c; Youngstown, 2.90c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69-70 per net ton; some sellers quoting up to $120 per gross ton.

Wire Rods: Pittsburgh, Chicago, Birmingham, 7/32 to 1/4-in., inclusive, $2.80-3.55 per 100 lb. 7/32 to 47/64-in., inclusive, $2.75, Cleveland; Galveston, $2.95; Worcester, $2.90-2.95. San Francisco (base del.), $3.5245.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in. (Base 20 tons one size): Pittsburgh, Youngstown, Chicago, Gary, Birmingham, 2.85-2.90c; Cleveland, Buffalo, 2.90c; Detroit, del., 3.11c; eastern Mich., 3.18c New York, del., 3.43c; Phila., del., 3.34-3.39c; San Francisco (base, del.), 3.5845-3.95c; Los Angeles (base, del.), 3.579-3.86c; Seattle, 3.8375-3.85c, base.

Rail Steel Bars: Same basing points as merchant carbon bars. Prices upon application.

Hot-Rolled Alloy Bars (Base 20 tons one size): Pittsburgh, Youngstown, Chicago, Gary, 3.20-3.30c; Canton, Massillon, Buffalo, Bethlehem, 3.30c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars (Base 40,000 lb): Pittsburgh, Chicago, Gary, Cleveland, Buffalo, 3.45-3.55c; Detroit, del. 3.61c; Toledo, 3.68c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Cleveland 4.00-4.10c; Gary, Buffalo, Canton, base 4.10c; Worcester, 4.20c.

Reinforcing Bars (New Billet): Pittsburgh, 2.70-2.75c; Chicago, Gary, Youngstown, Birmingham, 2.70; Sparrows Point, Buffalo, base 2.75c; San Francisco (base, del.), 3.3345c; Los Angeles (base, del.), 3.329c; Seattle, 3.88c-4.18c base.

Iron Bars: Single refined: Pittsburgh 7.70c (hand puddled), Economy, Pa., 8.65c. Double refined: Pittsburgh 9.75c (hand puddled), Economy, Pa., 10.00c. Staybolt: Pittsburgh 11.25c (hand puddled), Economy, Pa., 10.20c.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Birmingham, Youngstown, 2.75-2.80c; Cleveland, Buffalo, Sparrows Point, Ashland, Ky., base, 2.80c; Detroit, del., 3.01c; eastern Mich., del., 3.08c; Philadelphia, del., 3.06c; New York, del., 3.18c; Los Angeles (base, del.), 3.494-3.544c; San Francisco, (base, del.) 3.4995-3.5495c. (Alan Wood Steel Co., Conshohocken, Pa., quotes 4.20c, Sparrows Point equivalent).

Cold-Rolled Sheets: Pittsburgh, Chicago, Gary, 3.45-3.55c; Cleveland, 3.50-3.55c; Middletown, 3.50c; Buffalo, Youngstown, Sparrows Point, 3.55c; Granite City, 3.65c; Detroit, del., 3.66-3.76c; eastern Mich., del., 3.73-3.83c; New York, del., 3.93c; Philadelphia, del., 3.81c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Gary, Birmingham, 3.85-3.95c; Chicago, Sparrows Point, Canton, Middletown, 3.95c; Kokomo, 4.55c; Youngstown, 3.95-4.45c; Granite City, 4.35c; New York, del., 4.33c; Philadelphia, del., 4.21c; Los Angeles (base, del.), 4.624c; San Francisco (base, del.), 4.6295c.

Corrugated Galvanized Sheets, No. 10 (Based on 5-cent zinc): Pittsburgh, Chicago, 3.95-4.05c; Gary, Birmingham, Canton, Youngstown, Middletown, 3.95c.

Culvert Sheets, No. 16 flat (based on 5-cent zinc; corrugated 10 cents extra): Copper alloy: 4.45-4.55c, Pittsburgh, Gary, Birmingham; 4.55c Chicago; 4.90c, Kokomo; 5.00c, Granite City; 5.344c (base del.), Los Angeles; 5.3495c (base del.), San Francisco.
Copper-iron or pure iron: 4.80-4.90c, Pittsburgh; 4.80c, Gary; 4.90c, Chicago, Canton; 5.35c, Granite City.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 4.05c.

Enameling Sheets, No. 12: Pittsburgh, 3.85-3.95c; Chicago, Gary, 3.75-3.95c; Cleveland, Middletown, 3.85c; Youngstown 3.95c-4.45c; Granite City, 4.05c; Detroit, del., 4.16c; eastern Mich., 4.23c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.40-4.50c; Kokomo, Ind., 4.60c. Armature: Pittsburgh, 4.70-5.30c; Chicago, Gary, 4.70-4.80c; Granite City, Ill., 5.25c; Kokomo, Ind., 4.90c. Electrical: Pittsburgh, 5.20-5.80c; Chicago, Gary, 5.20-5.30c; Granite City, Ill., 5.75c; Kokomo, Ind., 5.40c Motor: Pittsburgh, 5.95-6.80c; Chicago, Gary, 5.95-6.05c; Granite City, 6.50c. Dynamo: Pittsburgh, 6.65-7.00c; Granite City, 7.20c. Transformer 72, 7.15-8.25c; 65, 7.85-9.20c; 58, 8.55-9.90c; 52, 9.35-9.45c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, 2.80c-3.30c; Chicago, Gary, Birmingham, Youngstown, Cleveland, 2.75-2.80c; Detroit, del., 3.01c; eastern Mich., del., 3.08c; San Francisco (base, del.), 3.5595c; Los Angeles (base, del.), 3.554c.

Cold-Rolled Strip: 0.25 carbon and less: Pittsburgh, 3.50-4.05c; Cleveland, 3.45-3.85c; Youngstown, 3.55-3.85c; Chicago, Gary, 3.55-3.65c; Detroit, del. 3.66-3.76c; eastern Mich., 3.73-3.83c; Worcester, base, 3.65c.

Cold-Finished Spring Steel: Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 4.95-5.05c; over 0.60 to 0.80, 5.55-5.65c; over 0.80 to 1.05, 7.05-7.15c; over 1.05 to 1.35, 9.35-9.45c; add 0.20c for Worcester.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, per base box of 100 lb, 1.25 lb coating $6.50, 1.50 lb coating $6.70; Sparrows Point, Birmingham and Warren, O., $6.60 and $6.80, respectively; Granite City, $6.70 and $6.90, respectively.

Electrolytic Tin Plate: Pittsburgh, Gary, per base box of 100 lb, 0.25 lb tin, $5.70; 0.50 lb tin, $5.90; 0.75 lb tin $6.10; Sparrows Point, Birmingham and Warren, O., $5.80, $6.00, $6.20, respectively; Granite City, $5.90, $6.10, $6.30, respectively.

Can Making Black Plate: Pittsburgh, Gary, per base box of 100 lb, 55 to 70 lb basis weight, $5.10; 75 to 95 lb basis weight, $5.00; 100 to 128 lb basis weight, $5.10. Birmingham and Warren, O., $5.20, $5.10 and $5.20, respectively.

Holloware Enameling Black Plate: Pittsburgh, Chicago, Gary, base 29-gage, 4.65c per lb; Sparrows Point, Warren, O., 4.75c; Granite City, 4.85c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, per base box of 100 lb, $5.80; Granite City, Birmingham, Sparrows Point, $5.90; Granite City, $6.

Roofing Ternes: Pittsburgh, per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $15.30.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, 2.90-2.95c; Cleveland, Sparrows Point, 2.95c; Coatesville, 3.45c; Claymont, 3.65c; Geneva, Utah, 2.90c; Det., del., 3.21c; New York, del., 3.33c; Phila., del., 3.21c; Boston, del., 3.51c; St. Louis, del., 3.269c; San Francisco and Los Angeles, del., 3.493c for sizes and grades produced at Geneva; 3.76c for sizes and grades produced at Fontana, Calif.
(Central Iron & Steel Co., Harrisburg, Pa., 5.10c, basing points.)

Floor Plates: Pittsburgh, 4.05c; Chicago, 3.95-4.05c; Gary, 3.95c; Cleveland, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Gary, 3.70c; Coatesville, 4.80c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 24.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, 2.75-2.80c; Buffalo, Bethlehem, 2.80c; New York, del., 3.06c; Phila., del., 2.98c; Geneva, Utah, 2.75c; Los Angeles (base, del.), 3.424-3.474c for sizes produced at Torrance, Calif.; Los Angeles and San Francisco, del., 3.343c for sizes produced at Geneva, 3.81c for sizes produced by Bethlehem in East; San Francisco, del., 3.54c for sizes produced at Fontana, Calif.

Beams, Wide Flange: Pittsburgh, Chicago, 2.70c.

Alloy Structural Shapes: Pittsburgh, Chicago, Gary, 3.45-3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds.)

Wire to Manufacturers in carloads

Bright, basic or bessemer..... *$3.45–4.00
Basic MB Spring (except Birm.)..**$4.85–4.95
Upholstery Spring (except Birm.) †$4.50–4.60

Wire Products to Trade in carloads

Wire, Merchant Quality
Annealed (6 to 8 base).....††$4.10–4.20
Galvanized (6 to 8 base).....††$4.55–4.65
(Fob Pittsburgh, Chicago, Duluth, Birmingham, per base column).

Nails

Standard, cement-coated, galvanized.. ‡91–94
Staples, polished and galvanized..... ‡‡91–94
Woven fence, 15½ gage and heavier. $97–100
Barbed wire, 80-rod spool .....§§111–113
Fence Posts (with clamps)..... ★107
Bale ties, single loop .....★★94-100

* Worcester, $3.55; Duluth, $3.50, base; San Francisco (base, del.) $4.4645 bright basic only.

** Worcester, $4.95; Duluth & Trenton, N.J., $5.10 (bright only); San Francisco (base del.) $5.8845.

† Worcester $4.60; Duluth and Trenton, N. J., $4.75, base, San Francisco (base, del.) $5.5345 black upholstery.

†† One producer quotes 25 cents higher at Birmingham and Chicago; Worcester $4.20 annealed, $4.65 galvanized; Cleveland, annealed $4.10, galvanized $4.55; Duluth $4.10 annealed, $4.55 galvanized; Kokomo, Ind., $4.80 annealed, $5.25 galvanized; San Francisco (base, del.) $5.1145 annealed, $5.5645 galvanized.

‡ Cols. 108 and 114 also quoted Pittsburgh; Worcester 97; Cleveland 97; Duluth, 91; San Francisco (base, del.) 112.

‡‡ Cols. 108 and 114 also quoted Pittsburgh; Worcester 97; San Francisco (base del.) 112.

§ Col. 101 also quoted at Pittsburgh; San Francisco (base del.) 120.

§§ San Francisco (base del.) 131.

★ Duluth, 104.

★★ San Francisco (base del.) 118; Chicago, Birmingham, 94-99.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.70-$2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.05 per 100 lb; light rails (rail-steel), Williamsport, Pa., Pittsburgh prices upon application.
Relaying, 60 lb and over fob warehouse $60-$65 per net ton.

Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates $3.55-$3.65 per 100 lb, fob mill; $3.40 base. Seattle; $3.70 fob Pittsburg, Calif. Splice bars $3.75-$3.85 per 100 lb fob mill. Standard spikes, 4.85c; screw spikes, 6.75c. Axles 4.45-4.50c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 to 2 points less on steel butt weld on sizes produced in that district.

	Butt Weld				
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	44½	17	1	52½–53½	36½–37½
¼	44½	21½	1¼	53–54	37–38
⅜	41	17	1½	53½–54½	37½–38½
½	47–48	29½–30½	2	54–55	38–39
¾	50–51	33½–34½	2½, 3..	54½–55½	38½–39½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	44½	28	44	27½	43½	27
2½ & 3	48½	32	47	30½	46½	30
3½-6	50½	34	49	32½	48½	32

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Butt Weld	In.	Butt Weld
⅛	43½	1	51½-52½
¼	43½	1¼	52-53
⅜	40	1½	52½-53½
½	46–47	2	53-54
¾	49–50	2½ & 3	53½-54½

In.	Lap Weld	Elec. Weld	Seamless
2	43½	43	42½
2½ & 3	46½	46	45½
3½-6	48½	48	47½
8	50½	50	49½
10	50	49½	49
12	49	48½	48

Standard Wrought Iron Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh.

	Butt Weld			Lap Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅜	+46½	+74½	1¼	+12	+34½
½	+11	+35	1½	+ 6	+27½
¾	+ 1½	+25	2	— 1½	+20
1 and 1¼	— 4	+16½	2½-3½	— 4	+16
1½	— 9½	+13	4	— 8	+10½
2	—10	+12½	4½-8	— 6	+12
			9-12	+ 3	+21½

Boiler Tubes: Net base prices per 100 ft. fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

		Seamless		Elec. Weld	
O.D. Sizes	B.W.G.	Hot Rolled	Cold Drawn	Hot Rolled	Cold Drawn
1"	13	....	$12.21	$11.51	$11.51
1¼"	13	....	14.46	11.48	13.64
1½"	13	$13.72	16.14	12.69	15.22
1¾"	13	15.60	18.37	14.43	17.31
2"	13	17.48	20.57	16.17	19.39
2¼"	13	19.48	22.93	18.02	21.62
2¼"	12	21.46	25.25	19.86	23.80
2½"	12	23.51	27.65	21.75	26.06
2¾"	12	24.91	29.30	23.05	27.63
3"	12	26.15	30.77	24.18	29.00
3¼"	11	30.44	35.82	28.16	33.77
3½"	11	32.68	38.47	30.23	36.27
4"	10	40.57	47.73	37.53	44.99
4½"	9	53.77	63.29	....	....
5"	9	62.25	73.25	....	....
6"	7	95.56	112.44	....	....

Pipe Cast Iron: Class B, 6-in. and over $79.50 per net ton, Birmingham; $84.50, Burlington, N. J.; $91.12, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 19c per cwt in carlots, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step, plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	45 off
⅝ and ⅝ x 6-in. and shorter	46 off
¾-in. and larger x 6-in. and shorter	43 off
All diameters longer than 6-in.	41 off
Tire bolts	35 off
Step bolts	43 off
Plows bolts	54 off
Lag bolts	
All diameters 6 in. and shorter	46 off
All diameters longer than 6 in.	44 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
7/16-in. and smaller	46 off	....
½-in. and smaller	....	44 off
½-in.-1-in.	44 off	....
⅝-in.-1-in.	....	43 off
1⅛-in.-1½-in.	42 off	41 off
1⅝-in. and larger	....	35 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	53 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	48 off
¾, ⅞, & 1 x 6 and shorter	44 off

Square Head Set Screws

Upset 1-in. and smaller	57 off
Headless, ¼-in. and larger	40 off
No. 10 and smaller	52 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural ½-in. and larger	5.65c
Lebanon, Pa.	.....5.65c plus 19c per cwt in cl., 26c lcl.
7/16-in. and under	55 off
Lebanon, Pa.	.....55 off plus 19c per cwt in cl., 26c lcl.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1-$2 off

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, cents per lb, Pittsburgh, Chicago, Cleveland, Bethlehem, Canton, Massillon, Middletown, Watervilet, Dunkirk, Syracuse, Reading, Ft. Wayne, Titusville, Brackenridge, Jersey City, W. Leechburg, Baltimore and Washington, Pa.

Grade	Bars, Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
	CHROMIUM NICKEL STEELS				
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50*	51.00*	40.50	51.00
310	53.50	56.50†	57.50‡	53.00	61.00
	STRAIGHT CHROMIUM STEEL				
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442, 443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
§501	9.00	13.00	17.50	13.00	18.50
§502	10.00	14.50	18.50	14.50	19.50
	****STAINLESS CLAD STEEL (20%)**				
304	....	24.00	22.00	....	....
410	....	22.00	20.00	....	....
430	....	22.50	20.50	....	....
446	....	29.00	27.00	....	....

One producer quotes: * 6.50c higher, † 3.50c higher, ‡ 10.00c higher. § Low chromium.
** Fob Pittsburgh, Washington and Coatesville, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., base	$40.00	$40.50	$41.00	$41.50
Newark, N. J., del.	42.39	42.89	43.39	43.89
Brooklyn, N. Y., del.	....	44.40	44.90	....
Philadelphia, del.	42.17	42.67	43.17	43.67
Birmingham, base	38.88	39.38	....	....
Cincinnati, del.	....	45.09	....	....
Buffalo, base	40.00†	40.00†	40.50†	41.00
Boston, del.	48.42	48.42	48.92	....
Rochester, del.	42.22	42.22	42.72	43.22
Syracuse, del.	43.025	43.025	43.525	44.025
Chicago, base	38.50	39.00	39.50	40.00
Milwaukee, del.	40.22	40.72	41.22	41.72
Muskegon, Mich., del.	....	43.98	44.48	....
Cleveland, fob furnace	38.50†	39.00†	39.50†	40.00
Akron, del.	40.67	41.17	41.67	42.17
Duluth, base	39.00	39.50	40.00	40.50
Erie, Pa., base	38.50	39.00	39.50	40.00
Everett, Mass., base	....	45.00	45.50	....
Granite City, Ill., base	45.25	45.75	46.25	....
St. Louis, del.	46.00	46.50	47.00	....
‡**Neville Island, Pa., base**	42.00	42.50	42.50	43.00
Pittsburgh, del., N.&S. Sides	43.08	43.58	43.58	44.08
Provo, Utah, base	39.00	39.50	....	....
Seattle, Tacoma, Wash., del.	....	46.63	....	....
Portland, Oreg., del.	....	46.63	....	....
Los Angeles, San Francisco	46.13	46.63	....	....
Sharpsville, Pa., base	39.00	39.50	39.50	40.00
Steelton, Pa., base	40.00	40.50	41.00	41.50
Struthers, O., base	39.50	....	....	....
Swedeland, Pa., base	45.00	45.50	46.00	46.50
Toledo, O., base	38.50	39.00	39.50	40.00
Cincinnati, del.	43.05	43.55	....	....
Youngstown, O., base	39.00	39.50	39.50	40.00
Mansfield, O.	42.87	43.37	43.37	43.87

† Republic Steel Corp. quotes $2.875 higher for No. 2 foundry and malleable and $2.375 higher for basic at Buffalo, and $1.25 higher at Cleveland, effective on shipments during week ended June 6.

‡ To Neville Island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaco; $1.73 Verona; $1.94 Brackenridge; $1.08 to Ambridge and Aliquippa.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)....$49.50
6.51-7.00..$50.75 9.01- 9.50. 57.00
7.01-7.50.. 52.00 9.51-10.00. 58.25
7.51-8.00.. 53.25 10.01-10.50. 59.50
8.01-8.50.. 54.50 10.51-11.00. 60.75
8.51-9.00.. 55.75 11.01-11.50. 62.00

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for blast furnace silveryy iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron

Si 14.01-14.50%, $77.50, Jackson, O.; $78.75, Niagara Falls; $78 open-hearth and $79 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.05% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn.....$58

(For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $39.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $46.00. Philadelphia, $48.81, delivered. Intermediate phosphorus, Central furnace, Cleveland, $42.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$12.00-$14.00
Connellsville, foundry	14.00- 16.25
New River, foundry	15.50
Wise county, foundry	14.25
Wise county, furnace	13.50

Oven Foundry Coke

Kearney, N. J., ovens	$20.50
Chicago, outside del.	19.50
Chicago, del.	20.75
Terre Haute, ovens	20.25
Milwaukee, ovens	20.25
New England, del.	21.75
Birmingham, del.	16.71
Indianapolis, ovens	19.50
Cincinnati, del.	20.50
Ironton, O., ovens	18.25
Erie, Pa., del.	21.55
Painesville, O., ovens	20.00
Cleveland, del.	21.55
Buffalo, del.	21.75-22.20
Detroit, del.	20.75
Philadelphia, ovens	19.55
Swedeland, Pa., ovens	19.50
Portsmouth, O., ovens	18.25

Coal Chemicals

Spot, cents per gallon

Pure and 90% benzol	21.00†
Toluol, two degrees	28.00
Industrial xylol	28.00
Solvent naphtha	28.00

Per pound fob works

Phenol (car lots, returnable drums)	13.00
Do., less than carlots	13.75
Do., tank cars	12.00

Eastern plants, per pound

Naphthalene flakes, balls, bbl. to jobbers, "household use"	12.00

Per ton, bulk, fob plants

Sulphate of ammonia	$40.00

† Freight allowed up to 2 cents.

Refractories

Net Prices

Per 1000, fob shipping point

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$92.00

High Heat Duty

Pa., Mo., Ky.	73.00
Ala., Ga.	73.00
N. J.	78.00

Intermediate Heat Duty

Ohio	67.00
Pa., Mo., Ky.	67.00
Ala., Ga.	59.00
N. J.	70.00

Low-Heat Duty

Pa., Md., Ohio	59.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	50.00
Wire Cut	48.00

Malleable Bung Brick

All bases	83.00

Silica Brick

Pennsylvania	73.00
Joliet, E. Chicago	82.00
Birmingham, Ala.	73.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	64.00
Chem. bonded chrome	64.00
Magnesite brick	86.00
Chem. bonded magnesite	75.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	27.00
Single bags	31.50

Dolomite

Domestic, dead-burned, bulk, net tons, fob Billmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $11.85; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, and Bonne Terre Mo.), add $0.20.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural) Lower Lake Ports

(Any increase or decrease in R. R. freight rates, dock handling charges and taxes thereon effective after Apr. 1, 1948, are for buyer's account.)

Old range bessemer	$6.60
Old range nonbessemer	6.45
Mesabi bessemer	6.35
Mesabi nonbessemer	6.20
High phosphorus	6.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%	13.50-14.00
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 67.60c-72.60c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	29.00-30.00
50% no ratio	29.50-30.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo., cont., Mines	$0.75

Fluorspar

Metallurical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $35; less than 60% $32.

HIGH STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Cleveland	Bethlehem	Canton Massillon
Sheet, Hot-Rolled	4.20	4.20-4.30	4.20-4.30	4.20-4.30	4.30	4.30	4.20	...	...
Cold-Rolled	5.20	5.20-5.30	5.20-5.30	5.20-5.30	...	5.30	5.20	...	...
Galvanized	5.90	.....	.....	.....	...	6.00	...	...	...
Strip, Hot-Rolled	4.20	4.30	4.20-4.30	4.20-4.30	...	...	4.20	...	...
Cold-Rolled	5.20	5.30†	5.30†	5.30	...	...	5.20	...	...
Shapes, Structural	4.20	4.20-4.30	4.20	4.30	...	...	...	4.30	...
Plates	4.45	4.45-4.55	4.45-4.55	.....	4.55	...	...	...	...
Bars, Small Shapes	4.35	4.35-4.45	4.35-4.45	4.35-4.45	...	4.45	...	...	4.45

† Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS			STRIP		BARS				PLATES	
	H-R 10 Ga.	C-R 17 Ga.	Gal. *10 Ga.	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½" & up	H-R Alloy **4140	Structural Shapes§§	Carbon ⅜"-¾"	Floor ⅜" & Thicker
New York (city)	4.94	5.80	6.13	5.58	...	5.05	5.78	7.23	4.77	5.09	6.58
New York (c'try)	4.79	5.65	5.98	5.43	...	4.90	...	...	4.62	4.94	6.43
Phila. (city) ..	4.67	5.81	5.90	5.16	5.72	4.87	5.75	8.65	4.57	4.85	6.36
Phila. (c'try.) .	4.52	5.66	5.75	4.81	5.57	4.73	...	...	4.47	4.71	6.21
Wash. (city) ..	4.81	...	...	5.08	...	5.14	5.79	...	4.98	5.03	6.68
Wash. (c'try.) .	4.71	...	...	4.98	...	5.04	...	...	4.88	4.93	6.58
Balt. (city) ...	4.27†	5.59	5.62	4.79	...	4.84	5.66	...	4.69	4.72	6.09
Balt. (c'try.) .	4.12†	5.44	5.40	4.64	...	4.69	...	...	4.54	4.57	5.94
Norfolk, Va. ..	4.90	...	...	...	...	5.20	6.00	...	5.15	5.15	6.90
Memphis (city)	4.91[20]§	5.98[8]†	...	5.11[20]	...	5.01[20]	5.88	...	5.01[20]	5.21[20]	6.83[20]
Memphis (c'try)	4.81[20]§	5.88[8]†	...	5.01[20]	...	4.91[20]	5.78	...	4.91[20]	5.11[20]	6.73[20]
Buffalo (city) .	4.25	5.20[5]	6.05	5.25	5.97	4.40	5.10	6.85	4.40	5.00	6.25
Buffalo (c'try.)	4.10	5.05[5]	5.50	4.70	5.82	4.25	4.95	6.85	4.25	4.45	5.75
Pitts. (city) ..	4.20-4.25§	5.05-5.10[8]†	5.60-5.65	4.30-4.35	5.35	4.35-4.40	5.05-5.10	6.85	4.35-4.40	4.55-4.60	5.80-5.90
Pitts. (c'try) ..	4.05-4.10§	4.85-4.95[8]†	5.40-5.50	4.15-4.20	5.20	4.20-4.25	4.85-4.95	6.85	4.20-4.25	4.40-4.45	5.65-5.75
Cleve. (city) ..	4.40-4.90	5.10-5.75[8]	5.74-6.45	4.52	5.25	4.35-4.40	5.00-5.10	7.14	4.67	4.55-4.60	5.80-5.90
Cleve. (c'try.) .	4.25-4.90	4.95-5.75[8]	...	...	5.10	4.20-4.25	4.85-4.95	...	...	4.40-4.45	5.65-5.75
Indianapolis ...	4.52	5.01[8]	5.96	4.62	5.87	4.67‡‡	5.52	8.85	4.67	4.87	6.17
Chicago (city) .	4.40	5.10[8]	5.55-5.65	4.30	5.35	4.35	5.00	6.70[9]	4.35	4.55	5.80
Chicago (c'try.)	4.25	4.95[8]	5.40-5.50	4.15	5.20	4.20	4.85	6.70[9]	4.20	4.40	5.65
Milwaukee	4.62	5.32[8]	5.77-5.87	4.52-5.02	5.57	4.57	5.334	7.184[9]	4.57	4.77	6.02
St. Paul, Minn..	4.66[6]	5.56[8]†	6.01[8]	4.76	6.29[12]	4.81[6]	5.94[11]	7.84[11]	4.81[6]	5.01[6]	6.26[6]
Birming. (c'try.)	4.45[20]§	...	5.65	4.45[20]	...	4.40[20]	6.09[22]	...	4.40	4.65	6.99
Birming. (city).	4.30[20]§	...	5.50	4.30[20]	...	4.25[20]	...	...	4.25	4.50	...
Houston, Tex. .	5.75	...	7.36	6.00	...	5.70	7.00	9.25[9]	5.70	5.90	7.20
Omaha, Nebr...	5.31	...	6.76	5.41	...	5.46	6.96	...	5.41	5.66	5.65
Seattle, Wash..	5.45[17]§	7.25[5]‡	7.10	6.15[17]	...	5.65[17]	7.35[1]	8.70[12]	5.30[17]	5.60[17]	7.65[17]
Tacoma, Wash..	5.45[17]§	7.25[5]‡	7.10	6.15[17]	...	5.65[17]	7.35[1]	8.70[12]	5.30[17]	5.60[17]	7.65[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 39,999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—400 to 14,999 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [16]—2000 lb and over; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § 18 gage and heavier; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ add 15c per 100 lb for slow moving items; §§ except wide flange beams, which are 0.05c lower.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $52, Palmerton, Pa., $51, Pittsburgh, 16% to 19% Mn., $51 Palmerton, $50, Pittsburgh.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $145 per gross ton of alloy, carload packed $157, ton lot $172, less ton $189; fob New Orleans, Mobile, Philadelphia, Baltimore, or New York. Carload, lump, bulk $151, fob cars Pittsburgh, including 50c switching charge. Add, or subtract, $1.80 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%.

West Coast Prices: Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $26.21 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with railroad freight allowed on shipments of 25 gross tons or more.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 22.5c per lb of contained Mn, carload packed 23.25c, ton lot 24.35c, less ton 25.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 16.5c per lb of contained Mn, carload packed 17.25c, ton lot 18.35c, less ton 19.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 32c per lb of metal, carload packed 32.5c, ton lot 34c, less ton 36c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 7.8c per lb of alloy, carload packed, 8.55c, ton lot 9.45c, less ton 10.45; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, c.l., lump, bulk 18.6c per lb of contained Cr, c.l., packed 19.5c, ton lot 20.65c, less ton 22.05c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Eastern Zone, contract, c.l., 8MxD, bulk 20.1c per lb of contained Cr, c.l., packed 21.0c, ton lot 22.35c, less ton 24.1c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 28.5c per lb of contained Cr, 0.04% C 27.5c, 0.05% C 27.0c, 0.06% C 26.5c, 0.10% C 26.0c, 0.15% C 25.5c, 0.20% C 25.25c, 0.50% C 25.0c, 1% C 24.5c, 2% C 24.25c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 25c per lb of contained chromium, carload, packed 26.1c, ton lot 27.3c, less ton 29.1c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 2c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 2c for each 0.25% of N above 0.75%.

Chromium Metal: (Mn. 97% Cr and 1% Fe). Eastern Zone, contract, carload, 1" x D, packed, max. 0.50% C grade, 93c per lb of contained chromium, ton lot 94.5c, less ton 97c; Central, add 1.5c for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 9.3c per lb of contained Si, carload packed 10.9c, ton lot 12.35c, less ton 14.0c; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (All 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 11.8c per lb of contained Si carload packed 13.1c, ton lot 14.25c, less ton 15.5c; Central, add 0.3c for c.l. add 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 13.3c per lb of contained Si, carload packed 14.55c, ton lot 15.55c, less ton 16.7c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 15c per lb of contained Si carload packed 16.2c, ton lot 17.15c, less ton 18.2c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max. Fe.) Eastern Zone, c.l., lump, bulk, regular 17.3c per lb of Si, c.l. packed 18.5c, ton lot 19.4c, less ton 20.4c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb cl 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c; smaller lots, 8.65c. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 12.5c per lb or briquet, carload packed 13.2c, ton lot 14.0c, less ton 14.9c; Central, add 0.25c for c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

(*Please turn to Page* 176)

Tin, Secondary Metals Advance

Government's selling price for Straits tin rises 9 cents a pound to $1.03. Secondary aluminum ingot advances about ¼-cent; bronze ingots, ¼ to 2 cents

NEW YORK — Tin Sales Corp., selling agent for the Reconstruction Finance Corp., raised its price 9 cents a pound last week for grade A tin for June delivery to domestic consumers. The new price is $1.03 a pound for Straits tin. The former 94-cent quotation had been in effect since the middle of December, 1947, when it was raised 14 cents a pound. Price action by the government's selling agency follows a 9-cent increase announced by the British.

As a direct result of this action, brass and bronze ingot makers advanced the price of bronze ingots ¼-cent to 2 cents a pound, the average advance being placed at 1 cent a pound, effective as of June 3. Remelt aluminum ingot prices advanced about ¼-cent a pound, reflecting a tightening in scrap aluminum supplies. Other major metal markets remained firm.

COPPER — John A. Donaher, metals industry consultant, Washington, in an address to the National Association of Purchasing Agents' convention last week said in part: "No expert in government or in industry with whom I have talked expects a slackening in demand for copper for years to come. None expects our domestic production of copper will greatly exceed 875,000 tons or that scrap be available in amounts much greater than 120,000 tons per year. Our continued foreseeable deficit on the industrial front will likely enough be increased because of possible export and certainly through the stockpiling needs of national defense . . . It takes years and large capital to improve output. Labor conditions, amount of water available, and many other factors enter into production and thereafter, price. One certain course is open to us, and that is that we import as much copper as is possible, as cheaply as possible, as soon as possible. Outright repeal or a long-term suspension of the excise tax on copper imports is essential."

Sales of copper in both the domestic and export markets were light last week with prices steady at 21.50c, delivered Connecticut, and 21.50c to 22.25c, f.a.s. New York.

LEAD—Only light volume of business was transacted in the domestic lead market last week, pending the opening of July books. Prices held firm at 17.30c to 17.35c, St. Louis, and 16.50c to 16.75c f.a.s Gulf ports.

ZINC — A stronger price tone developed in the zinc market last week. While prime western zinc held unchanged at 12.00c, East St. Louis, in the domestic market, sales were reported in the export market at 12.87-1/2, f.a.s. Gulf ports, representing an advance of 1/8-cent. The trade was still awaiting Congressional action on the proposed metal subsidy bill.

TIN — Preceding the advance in tin prices here, the British Ministry of Supply advanced the buying and selling price of all grades of pig tin £50 per ton, effective June 1. The new selling price of 99 to 99.75 per cent grade tin is now £569. In Canada, the price is reported to have advanced 10 cents to $1.06 in carlots.

Compared with the present price of $1.03 for grade A tin, the all-time high was reached in 1918 when $1.10 was recorded. The average for that year, however, was below the 90-cent level.

The House approved last Thursday a report extending through June 30, 1949, the government's power to control tin and certain other scarce materials and transportation facilities. The Senate was expected to approve the conference measure and send it to the White House promptly.

Aluminum—Reynolds Metals Co. closed the $43 million plant which it leases from the government at Troutdale, Oreg., late Wednesday, due to explosion danger if the flooded Columbia river should reach hot potlines. The plant has an annual production of 163 million pounds of pig aluminum.

Meanwhile, Aluminum Co. of America's Vancouver plant, entirely surrounded by water, continued in operation at least through Thursday. Officials believed the plant's own dikes would hold.

Smelters advanced prices on all grades of secondary aluminum about ¼-cent a pound last week. Although demand continues fairly active, the advance was due primarily to a strengthening in the scrap market.

Inaugurating a new service, Aluminum Association reported that a total of 106,553,273 pounds of primary aluminum were produced in April, and increase of 2,804,637 pounds over March, and 105,400,869 pounds of aluminum sheet, plate and strip, a decrease of 19,806,073 pounds, were shipped by its member companies. Members account for all the primary aluminum production of aluminum in the United States and about 97 per cent of the total shipments of sheet, plate and strip.

No Immediate Improveme In Lead Supply Foreseen

Sun Valley, Idaho — There appears little likelihood that the shortage of lead will be completely relieved so long as the current business boom lasts, declared Robert L. Ziegfeld, secretary, Lead Industries Association, in an address here May 31 before the Idaho Mining Association.

He modified the statement by saying the shortage may be alleviated to some extent by gradually increasing mine production, improved labor supply, recent settlement of the strikes in Mexico and lessened demand as pent-up requirements are filled. On the other hand, possible strikes, lower production from scrap, demands of ERP and rearmament program may tend to operate in the opposite direction, he said.

Mr. Ziegfeld estimated monthly supply at between 96,000 and 97,000 tons compared with consumption of about 98,000 tons during the first quarter, the difference being accounted for largely by a small drop in refinery stocks of pig lead. Since the end of the first quarter, the American consumer has been hit by strikes in Mexico which accounted for the loss of many thousands of tons in April and May. "Also, hanging over his head is the government desire to stockpile," he added.

With the secondary market restricted to production of between 35,000 and 40,000 tons a month from currently generated scrap, interest centers in mine production which "is making a strong bid to hit 425,000 tons," compared with 375,000 tons in 1947 and 332,000 in 1946.

Some lines of consumption have shown some slackening, he said, but there are others that are hungry for whatever lead those lines don't need. It has been feared that the high price of lead would cause a substantial amount of substitution of other materials but that has not yet occurred to any great extent, although there is considerable resistance in some lines.

METAL PRICE AVERAGES FOR MAY

(Cents per pound)

Electrolytic Copper, del. Conn.	21.500
Lead, St. Louis	17.325
Prime Western Zinc, E. St. Louis	12.000
Straits Tin, New York	94.000
Primary Aluminum Ingots, del.	15.000
Antimony, f.o.b. Laredo, Tex.	33.700
Nickel, f.o.b. refinery	33.750
Silver, New York	74.625

Aluminum Plant May Be Built in British Columbia

Vancouver, B. C. — Aluminum Co. of Canada may establish a large plant on the British Columbia coast. R. E. Powell of Montreal, president, said he thinks the company will go ahead with a preliminary engineering study, possibly within a month.

Mr. Powell has returned here following inspection of sites at Bute Inlet, Dean channel, 300 miles north and at Gardner canal, near Prince Rupert. If the preliminary survey indicates the Bute Inlet site is advisable, Mr. Powell said, the company will have to spend about $1 million on an engineering survey to lay out a development plan. Engineers believe it is possible to develop more than 1 million horsepower from water in the Chilkotaseko region, 40 miles inland from Bute Inlet.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic, 21.50c, Conn. Valley; Lake, 21.62½c Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 19.00-19.25c; 88-10-2 (No. 215) 29.00c; 80-10-10 (No. 305) 25.25c; No. 1 yellow (No. 405) 15.25-16.00c. Prices include 25 cents per 100 lb freight allowance.

Zinc: Prime western 12.00c, brass special 12.25c, intermediate 12.50c, East St. Louis; high grade 13.00c, delivered.

Lead: Common 17.30-17.35c; chemical and corroding 17.40c St. Louis.

Primary Aluminum: 99% plus, ingots 15.00c, pigs 14.00c; metallurgical 94% min. 13.50c. Base prices for 10,000 lb and over, fob shipping point, freight allowed.

Secondary Aluminum: Piston alloy (No. 122 type) 19.50-20.00c; No. 12 foundry alloy (No. 2 grade) 19.00-19.50; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 20.50-21.00c; grade 2 19.75-20.50c; grade 3, 19.25-20.00c; grade 4 18.75-19.50c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, fob Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.64% $1.024, grade F, 98-98.99% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American, 99-99.8% and over but not meeting specifications below, 35.00; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 35.50c, fob Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 33.75c; 25-lb pigs, 35.25c; shot, 36.25c; "F" nickel shot or ingots, for addition to cast iron, 34.25c. Prices include import duty.

Mercury: Open market, spot, New York $74-$76 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $20.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $1.75, del.; Special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 per lb for 550 lb (keg); $1.67 per lb for 100 lb (case); $1.72 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 74.62½c per ounce.

Platinum: $98-$101 per ounce.

Palladium: $24 per troy ounce.

Iridium: $110-$120 per troy ounce.

Plating Materials

Chromic Acid: 99.9%, flake, fob Philadelphia, carloads, 22.00c; 5 tons and over 22.50c; 1 to 5 tons, 23.00c; less than 1 ton, 23.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 44.00c, fob Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 15.00c; 1000 to 19,900 lb, 14.00c fob Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.00c; over 250 lb, 24.00c, fob Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; fob Cleveland. Add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 23.50c; 275-lb, or 500-lb bbls. 21.50c, fob Cleveland.

Tin Anodes: Bar, 1000 lb and over 110.00c; 500 to 999 lb, 110.50c; 200 to 499 lb, 111.00c; less than 200 lb, 112.50c; ball, 1000 lb and over, 112.25c; 500 to 999 lb. 112.75c; 200 to 499 lb, 113.25c; less than 200 lb, 114.75c, fob Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers and resellers, 67.4c; 100 or 300 lb drums only, 100 to 500 lb, to consumers 59.2c, to resellers 54.8c; 600 to 1900 lb, to consumers 56.8c, to resellers 52.5c; 2000 to 9900 lb, to consumers 55.0c, to resellers 50.9c; 10,000 lb or more l.c.l., to consumers 53.9c, to resellers 49.9c; carloads, to consumers 52.7c, to resellers 48.7c. Prices fob Sewaren, N. J.

Zinc Cyanide: 100-lb drums 37.25c, fob Cleveland; 37.00c, Detroit; 36.00c, fob Philadelphia.

Stannous Sulphate: Less than 2000 lb, in 100 lb kegs, 96.50c, in 400 lb bbl, 95.50c; more than 2000 lb, in 100 lb kegs, 95.50c, in 400 lb bbl, 94.50c.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, fob mill.)

Sheet: Copper 33.68c; yellow brass 30.16c; commercial bronze, 95% 33.80c, 90% 33.27c; red brass, 85% 32.23c, 80% 31.70c; best quality 31.09c; Everdur, Duronze, Herculoy or equiv., hot-rolled, 38.56c; nickel silver, 18%, 42.42c; phosphor bronze, grade A, 5%, 52.70c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.69c; commercial bronze, 95% 33.49c, 90% 32.96c; red brass, 85% 31.92c, 80% 31.39c.

Seamless Tubing: Copper 33.72c; yellow brass 32.92c; commercial bronze 90% 35.68c; red brass 85% 34.89c, 80% 34.36c.

Wire: Yellow brass 30.45c; commercial bronze, 95% 34.09c, 90% 33.56c; red brass, 85% 32.52c, 80% 31.99c; best quality brass 31.38c.

Copper Wire: Bare, soft, fob eastern mills, c.l. 26.80c, l.c.l. 27.30c; weatherproof, fob eastern mills, c.l. 27.35c, l.c.l. 27.85c; magnet, delivered, c.l. 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, l.c.l. 30.50c-31.88c.

ALUMINUM

(Base prices, fob shipping point)

Sheets and Circles: 2s and 3s mill finish c.l., fob shipping point.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	24.0	...	...
0.135-0.126	12-48	24.5	...	...
0.125-0.096	12-48	24.5	23.1	26.3
0.095-0.077	12-48	25.0	23.2	26.5
0.076-0.061	12-48	25.5	23.4	26.7
0.060-0.048	12-48	25.7	23.6	27.0
0.047-0.038	12-48	26.1	23.8	27.3
0.037-0.030	12-48	26.4	24.1	27.7
0.029-0.024	12-48	26.8	24.4	28.1
0.023-0.019	12-36	27.4	24.8	28.6
0.018-0.017	12-36	27.9	25.3	29.3
0.016-0.015	12-36	28.6	25.9	30.1
0.014	12-24	29.4	26.6	31.1
0.013-0.012	12-24	30.2	27.3	32.0
0.011	12-24	31.1	28.1	33.1
0.010-0.0095	12-24	32.1	29.0	34.3
0.009-0.0085	12-20	33.2	30.0	35.7
0.008-0.0075	12-20	34.4	31.1	37.1
0.007	12-18	35.7	32.3	38.8
0.006	12-18	37.0	33.5	42.6

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

LEAD

(Prices to jobbers, fob Cleveland, Pittsburgh)

Sheets: Full rolls, 140 sq ft or more, $20.85 per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft; $1.25, less than 10 sq ft; $1, circles and segments. Pipe: Full coils, $20.10 per cwt; cut coils, $20.35. Traps and Bends: List price plus 52%.

ZINC

Sheets, 16.50c-17.00c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 15.25c-16.00c, fob mill, 36,000 lb and over. Plates, not over 12-in., 14.25c; over 12-in., 15.25c.

NICKEL

(Base prices, fob mill.)

Sheets, cold-rolled, 54.00c. Strip, cold-rolled, 60.00c Rods, hot-rolled 50.00c, cold-finished 55.00c. Angles, hot-rolled, 50.00c. Plates, 52.00c. Seamless tubes, 83.00c.

MONEL

(Base prices, fob mill.)

Sheets, cold-rolled 43.00c; No. 35, 41.00c. Strip, cold-rolled, 44.00c. Rods, hot-rolled 39.00c; cold-finished 44.00c. Angles, hot-rolled, 39.00c. Plates, 41.00c. Seamless tubes, 71.00c. Shot and blocks, 31.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb. 35.00-36.00c.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)

Prices in cents per pound for less than 15,000 lb fob shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.625	15.375	14.750
Commercial Bronze			
95%	18.125	17.875	17.375
90%	17.625	17.375	16.875
Red brass			
85%	17.500	17.250	16.750
80%	17.250	17.000	16.500
Best Quality (71-79%)	16.625	16.375	15.875
Muntz Metal	14.750	14.500	14.000
Nickel silver, 5%	16.500	16.250	8.250
Phos. bronze, A. B.	20.750	20.500	19.500
Naval brass	15.250	15.000	14.500
Manganese bronze	15.250	15.000	14.375

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.25, No. 2 copper 17.25, light copper 16.25, composition red brass 14.50-14.75, auto radiators 11.75-12.00, heavy yellow brass 10.50-10.75, brass pipe, 11.50-11.75.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 18.50, No. 2 copper 17.50, light copper, 16.50, refinery brass (60% copper), per dry copper content 16.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.50-16.75, No. 2 15.50-16.00, light copper 14.50-14.75, No. 1 composition red brass 12.75-13.00, No. 1 composition turnings 12.25-12.50, mixed brass turnings 7.25-7.50, new brass clippings 12.50-13.00, No. 1 brass rod turnings 10.00-10.50, light brass 6.50-7.00, heavy yellow brass 9.00-9.25, new brass rod ends 10.50-11.00, auto radiators, unsweated 10.00-10.25, cocks and faucets 10.00-10.25, brass pipe 10.00-10.25.

Lead: Heavy 15.00-15.25, battery plates 9.50-9.75, linotype and stereotype 16.00-16.50, electrotype 13.50-14.00, mixed babbitt 14.25-14.75, solder joints, 17.25-17.75.

Zinc: Old zinc 5.75-6.00, new die cast scrap 4.75-5.25, old die cast scrap 2.75-3.25.

Tin: No. 1 pewter 60.00-62.00, block tin pipe 77.00-78.00, auto babbitt 46.50-47.00, No. 1 babbitt 46.50-48.00, siphon tops 45.00-47.00.

Aluminum: Clippings 2S 10.00-10.50, old sheets 8.00-8.50, crankcases 8.00-8.50, borings and turnings 3.25-3.75, pistons, free of struts, 8.00-8.50.

Nickel: Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

Monel: Clippings 12.00-12.50, turnings 7.00-7.25, old sheets 10.00-10.50, rods 10.00-10.50 castings 9.00.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
May Avg.	21.500	17.325	12.000	94.000	15.000	33.700	33.750	74.625
May 1-21	21.500	17.30-17.35	12.000	94.000	15.000	33.000	33.750	74.625
May 22-29	21.500	17.30-17.35	12.000	94.000	15.000	35.500	33.750	74.625
June 1-3	21.500	17.30-17.35	12.000	103.000	15.000	35.500	33.750	74.625

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$40.00-40.50*
No. 2 Heavy Melt. Steel	40.00-40.50*
No. 1 Busheling	40.00-40.50*
Nos. 1, 2 & 3 Bundles	40.00-40.50*
Machine Shop Turnings	36.50-37.00
Mixed Borings, Turnings	36.50-37.00
Short Shovel Turnings	37.00-37.50
Cast Iron Borings	36.50-37.00
Bar Crops and Plate	47.50-48.00
Low Phos. Steel	47.50-48.50
Heavy Turnings	39.50-40.00

Cast Iron Grades

No. 1 Cupola	64.00-65.00
Charging Box Cast	53.00-54.00
Heavy Breakable Cast	56.00-58.00
Unstripped Motor Blocks	52.00-53.00
Malleable	69.00-70.00
Brake Shoe	52.00-53.00
Clean Auto Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.00-41.50
R.R. Malleable	75.00-80.00
Axles	51.50-52.00
Rails, Rerolling	56.00-58.00
Rails, Random Lengths	54.00-56.00
Rails, 3 ft and under	61.50-62.00
Rails, 18 in. and under	62.50-63.50
Railroad Specialties	54.00-55.00
Uncut Tires	52.00-52.50
Angles, Splice Bars	53.00-54.00

* Plus applicable freight springboard.

CLEVELAND

No. 1 Heavy Melt. Steel	$39.50-40.00*
No. 2 Heavy Melt. Steel	39.50-40.00*
No. 1 Busheling	39.50-40.00*
Nos. 1 & 2 Bundles	39.50-40.00*
Machine Shop Turnings	34.50-35.00
Mixed Borings, Turnings	34.00-36.00
Short Shovel Turnings	35.50-36.00
Cast Iron Borings	35.50-36.00
Bar Crops and Plate	44.50-45.00
Punchings & Plate Scrap	44.50-45.00
Heavy Turnings	39.50-40.50
Alloy Free Turnings	37.50-38.50
Cut Structurals	46.00-49.00

Cast Iron Grades

No. 1 Cupola	67.00-69.00
Charging Box Cast	58.00-60.00
Stove Plate	58.00-60.00
Heavy Breakable Cast	54.00-56.00
Unstripped Motor Blocks	58.00-60.00
Malleable	73.00-75.00
Brake Shoes	52.00-53.00
Clean Auto Cast	68.00-70.00
No. 1 Wheels	58.00-60.00
Burnt Cast	56.00-57.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*
R.R. Malleable	73.00-78.00
Rails, Rerolling	57.00-58.00
Rails, Random Lengths	56.00-57.00
Rails, 3 ft and under	61.00-63.00
Cast Steel	56.00-58.00
Railroad Specialties	53.00-55.00
Uncut Tires	56.00-57.00
Angles, Splice Bars	57.00-59.00

* Plus applicable freight springboard.

VALLEY

No. 1 Heavy Melt. Steel	$40.00-40.50*
No. 2 Heavy Melt. Steel	40.00-40.50*
No. 1 Bundles	40.00-40.50*
Machine Shop Turnings	34.50-35.50
Short Shovel Turnings	36.50-37.00
Cast Iron Borings	36.00-36.50
Low Phos.	46.00-47.50*

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*

* Plus applicable freight springboard.

MANSFIELD

Machine Shop Turnings	$35.00-35.50
Short Shovel Turnings	37.00-37.50

CINCINNATI

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
Nos. 1 & 2 Bundles	39.50
Machine Shop Turnings	33.50
Mixed Borings, Turnings	32.50
Short Shovel Turnings	35.50
Cast Iron Borings	34.50

Cast Iron Grades

No. 1 Cupola Cast	55.00
Charging Box Cast	43.00
Heavy Breakable Cast	50.00
Stove Plate	47.00
Unstripped Motor Blocks	45.00
Brake Shoes	45.00
Clean Auto Cast	55.00
Drop Broken Cast	60.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50
R.R. Malleable	68.00
Rails, Rerolling	53.00
Rails, Random Lengths	50.00
Rails, 18 in. and under	60.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$35.00-35.50
No. 1 Busheling	35.00-35.50
Nos. 1 & 2 Bundles	35.00-35.50
No. 3 Bundles	35.00-35.50
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings	30.00-30.50
Cast Iron Borings	30.00-30.50
Punchings & Plate Scrap	40.00-40.50

Cast Iron Grades

No. 1 Cupola Cast	58.00-60.00
Heavy Breakable Cast	48.00-50.00
Clean Auto Cast	60.00-62.00

BUFFALO

No. 1 Heavy Melt. Steel	$43.00-45.00
No. 2 Heavy Melt. Steel	39.75-40.25
No. 1 Busheling	39.75-40.25
No. 1 & 2 Bundles	39.75-40.25
Machine Shop Turnings	34.75-35.25
Mixed Borings, Turnings	34.75-35.25
Cast Iron Borings	35.50-36.00
Short Shovel Turnings	35.50-36.00
Low Phos.	44.75-45.75

Cast Iron Grades

No. 1 Cupola	64.00-65.00
Mixed Cupola	60.00-62.00
Heavy Breakable Cast	55.00-57.00
Malleable	70.00-75.00
Clean Auto Cast	62.00-64.00

Railroad Scrap

Rails, 3 ft. and under	53.00-55.00
Railroad Specialties	51.00-53.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$42.00-43.00
No. 2 Heavy Melt. Steel	39.00
No. 1 Busheling	39.00
Nos. 1 & 2 Bundles	39.00
No. 3 Bundles	37.00
Machine Shop Turnings	34.00-35.00
Mixed Borings, Turnings	34.00-35.00
Short Shovel Turnings	34.00-35.00
Bar Crop and Plate	47.50-48.00
Punchings & Plate Scrap	46.50-47.50
Cut Structurals	46.50-47.50
Elec. Furnace Bund'es.	43.50-44.50
Heavy Turnings	42.50-43.00
No. 1 Chemical Borings	42.00-43.00

Cast Iron Grades

No. 1 Cupola Cast	63.00-65.00
No. 1 Machinery Cast	66.00-67.00
Charging Box Cast	61.50-62.50
Heavy Breakable Cast	61.50-62.50
Unstripped Motor Blocks	59.50
Malleable	76.00-78.00
Clean Auto Cast	64.00
No. 1 Wheels	68.00-70.00

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.50
No. 2 Heavy Melt. Steel	34.50
No. 1 Busheling	34.50
Nos. 1 & 2 Bundles	34.50
No. 3 Bundles	32.50
Machine Shop Turnings	28.50-29.00
Mixed Borings, Turnings	28.50-29.00
Short Shovel Turnings	30.50-31.00
Punchings & Plate Scrap	40.00-41.00
Cut Structurals	40.00-41.00
Elec. Furnace Bundles	40.00-41.00

Cast Iron Grades

No. 1 Cupola Cast	55.00-57.00
Charging Box Cast	56.00-58.00
Heavy Breakable	56.00-58.00
Unstripped Motor Blocks	52.50-53.50
Malleable	68.00-69.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.90
No. 2 Heavy Melt. Steel	31.90
No. 1 Bundles	31.90
No. 1 Busheling	31.90
Machine Shop Turnings	26.90
Mixed Borings, Turnings	26.90
Short Shovel Turnings	28.90
Bar Crops and Plate	35.00-37.00
Punchings & Plate Scrap	35.00-37.00
Chemical Borings	37.00-37.50

Cast Iron Grades

No. 1 Cupola Cast	58.00-60.00
Heavy Breakable Cast	53.00
Stove Plate	52.00
Unstripped Motor Blocks	49.00
Clean Auto Cast	52.00-53.00

CHICAGO

No. 1 Heavy Melt. Steel	$39.00-39.50
No. 2 Heavy Melt. Steel	39.00-39.50
No. 1 Bundles	39.00-39.50
No. 2 Bundles	39.00-39.50
No. 3 Bundles	37.00-37.50
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Short Shovel Turnings	36.00-36.50
Cast Iron Borings	35.50-36.00
Bar Crops and Plate	46.50-47.00
Punchings	48.00-48.50
Elec. Furnace Bundles	40.00-40.50
Heavy Turnings	38.50-39.00
Cut Structurals	44.00-44.50

Cast Iron Grades

No. 1 Cupola Cast	68.00-70.00
Clean Auto Cast	68.00-70.00
No. 1 Wheels	62.00-65.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.25-44.25
Malleable	75.00-76.00
Rails, Rerolling	52.00-53.00
Rails, Random Lengths	49.00-50.00
Rails, 3 ft and under	56.00-57.00
Rails, 18 in. and under	58.00-59.00
Railroad Specialties	52.00-53.00
Angles, Splice Bars	52.00-53.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$40.50-41.00
No. 2 Heavy Melt. Steel	37.50-38.00
Machine Shop Turnings	32.50-33.50
Short Shovel Turnings	34.50-35.50

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	65.00-67.00
Mixed Cast	59.00-60.00
Heavy Breakable Cast	55.00-56.00
Brake Shoes	57.00-58.00
Clean Auto Cast	65.00-67.00
Burnt Cast	59.00-60.00

Railroad Scrap

R.R. Malleable	65.00-70.00
Rails, Rerolling	50.50-52.50
Rails, Random Lengths	50.00-51.00
Rails, 3 ft and under	56.00-58.00
Uncut Tires	48.00-49.00
Angles, Splice aBrs	55.00-56.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$37.50
No. 2 Heavy Melt. Steel	37.50
No. 1 Busheling	37.50
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	35.00
Long Turnings	24.50
Short Shovel Turnings	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	40.00
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	63.00
Stove Plate	60.00-62.00
No. 1 Wheels	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	nom.
Axles, Steel	50.00
Rails, Rerolling	53.00-55.00
Rails, Random Length	45.00-48.00
Rails, 3 ft and under	53.00-55.00
Angles and Splice Bars	52.00-53.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$25.00
No. 2 Heavy Melt. Steel	*25.00
No. 1 Busheling	*25.00
Nos. 1 & 2 Bundles	*25.00
No. 3 Bundles	*20.00
Machine Shop Turnings	*15.50
Bar Crops and Plate	25.00
Cast Steel	25.00
Alloy Free Turnings	15.50
Cut Structurals	25.00
Tin Can Bundles	20.00

Railroad Scrap

No. 1 Heavy Melting	26.00
Axles	32.00
Rails, Random Lengths	26.50
Uncut Tires	33.50

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$26.00
No. 2 Heavy Melt. Steel	26.00
No. 1 Busheling	26.00
Nos. 1 & 2 Bundles	22.00-23.00
No. 3 Bundles	22.00-23.00
Machine Shop Turnings	14.50-16.50
Mixed Borings, Turnings	14.50-16.50
Punchings & Plate Scrap	26.00-28.00
Cut Structurals	26.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	40.00
Charging Box Cast	25.00
Heavy Breakable Cast	24.00
Stove Plate	25.50
Unstripped Motor Blocks	24.00
Malleable	30.00
Brake Shoes	30.00
Clean Auto Cast	30.00
No. 1 Wheels	26.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable	30.00
Rails, Random Lengths	21.50
Angles and Splice Bars	23.00

LOS ANGELES

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
Nos. 1 & 2 Bundles	25.00
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

HAMILTON, ONT.

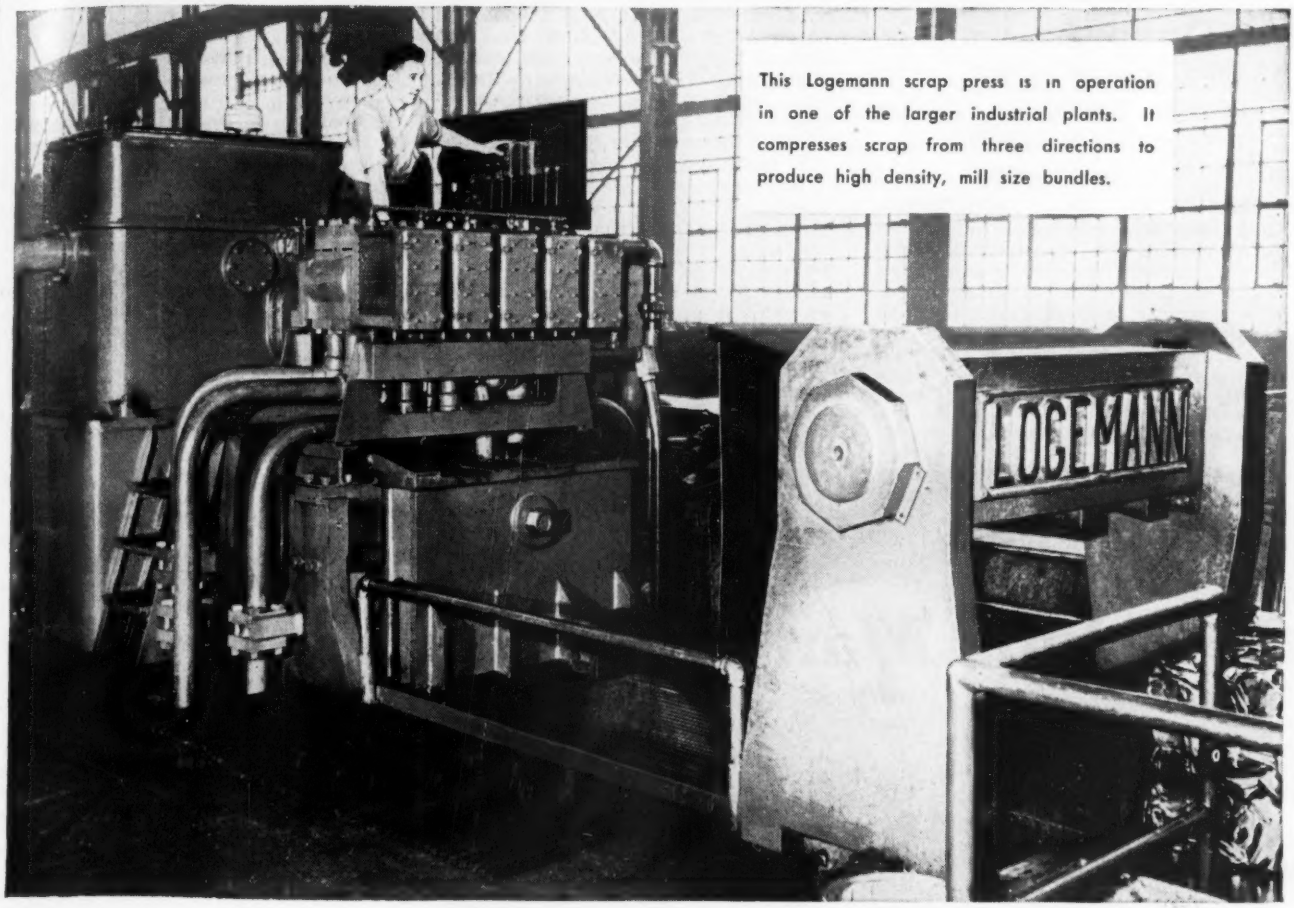
(Ceiling prices, delivered)

Heavy Melt.	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	28.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	42.00-48.00
No. 2 Cast	35.00-37.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.



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Sheets, Strip . . .

Third quarter quotas show general reduction. Stainless price revisions expected

Sheet Prices, Page 156

New York — Sheet sellers generally have now concluded the set up of quotas for third quarter. A couple of the larger mills have not acted fully on September allotments, but these appear to be the exception. As has been expected, quotas for the general trade are lighter than for the current period, and this is especially true here in the case of midwestern mills which have to contend with eastern basing points and the higher freight rates which became effective about a month ago. Actually, since current quotas were established, Sparrows Point has been set up as a base on cold-rolled sheets, as well as on hot and galvanized sheets.

However, one large midwestern independent, making a variety of sheet products, claims that his eastern quotas as a whole will nevertheless be heavier in third quarter. While allotments of hot and cold-rolled and galvanized sheets will be somewhat lighter, the shrinkage will be more than offset by heavier allotments in other grades. Of course, it is the major grades of hot and cold-rolled and galvanized sheets which are in special demand. Nevertheless, this seller points out that the new quotas on the other grades will be fully absorbed.

Boston — As flat-rolled finished steel prices become stabilized at varying levels resulting from uneven mill revisions, it becomes obvious lower costs to consumers are negligible, notably carbon sheets and strip. In many cases users are paying more for hot-rolled sheets due to higher freights with costs slightly lower for cold-rolled on the Sparrows Point base, the charge being 1 cent per 100 pounds lower from that point than from Buffalo. Mills still distributing in this territory are generally meeting the Sparrows Point or Buffalo base, depending on which is lower, the latter still holding that position on delivery to some points. The cold-rolled strip price structure is more confused with an uneven pattern operative. In most cases consumers of flat-rolled now fully appreciate the extent of third quarter reductions in allocations. Production losses will be substantial due to vacation shutdowns and will be extremely heavy if a coal strike closes the steel mills. These factors, coupled with carryovers and a determination to reduce the latter, points to lower steel deliveries this quarter and probably in the fourth quarter. No tonnage in hot-rolled sheets from some mills is the word out for this quarter at least.

Pittsburgh — Producers report very few, if any, order cancellations despite occasional report of easing in demand for home appliances. Some decline in steel requirements is reported by one interest for small 5-gallon steel containers. However, occasional openings in rolling schedules that have developed are quickly taken up by demand from other end uses. Most sheet sellers intend to make up carryover tonnage durning July. Deliveries on stainless steel sheets are extended into late third quarter, while stainless strip cannot be had until fourth quarter. No price action on stainless has yet been announced, but is expected within the next few weeks. It is indicated whatever price action is taken will involve extras in addition to base prices.

Philadelphia—Third quarter sheet quotas on the major grades, such as hot and cold-rolled and galvanized sheets, are down from the current quarter, although allotments for electrical sheets and certain other grades are slightly better. In all cases, excepting for certain specialties, including notably stainless sheets, demand continues well in excess of supply.

Chicago — Evidence that there is a slackening in production of certain lines of consumers goods is not to be found yet at mill level. Makers of sheets and strip report that consumers are taking shipments up to their full quotas and there is a complete lack of concellations or requests to hold back tonnage. Yet, reports persist of slackening tempo in output of electrical appliances, such as refrigerators, freezers, stoves, and the like. Showrooms appear well stocked and it is said that pipelines are approaching the filled-up condition, a situation that is developing from growing customer resistance to high prices. Manufacturers may be taking advantage of this period to allow flat-rolled steel

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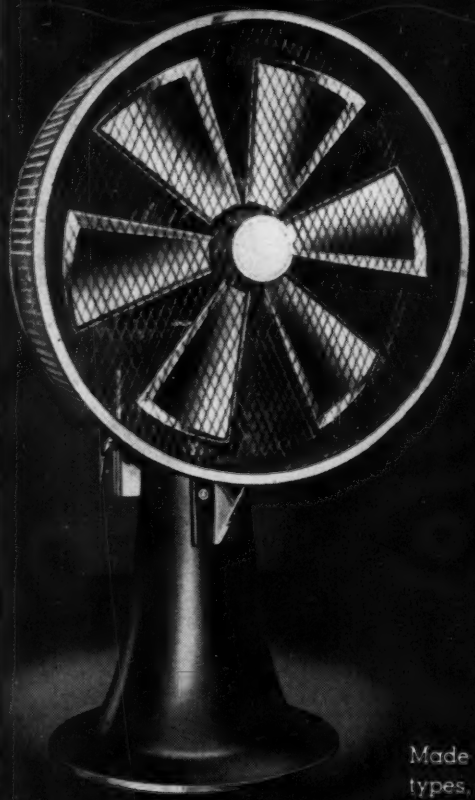

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Cincinnati — District sheet mills are setting up third quarter schedules which disclose the effect of stoppages due to strikes and floods in the current quarter. Heaviest cut in allocations is in hot-rolled. Barring unforeseen curtailments in production, schedules are designed to reduce the carryover tonnage for the fourth quarter.

Birmingham — Current industry is joined by prospective industry in this district in deploring the shortage of sheets. Steel users generally are pretty loud in their criticism of mills for the way the allocation system works. Sheet steel is one of the principal items involved. Not much emphasis is being placed on strip at the moment, although a fair tonnage of cotton ties and barrel hoops is being turned out.

St. Louis — Granite City Steel Co., this district's principal sheet producer, has announced there will be no price increase as a result of the recent pig iron price boost posted by Missouri-Illinois Furnaces Inc. However, it appears definitely to have killed plans for a sheet price reduction in the United States Steel pattern. Sheet production continues to fluctuate between 30 and 50 per cent of capacity due to adjustment difficulties in auxiliary equipment on Granite City Steel's new cold reduction mill.

Steel Bars . . .

Bar Prices, Page 156

Philadelphia—Sellers of hot carbon bars report increasing demand for the larger sizes, reflecting greater activity in heavy machinery and equipment and in ship work. This is obvious in jobbing forge shop requirements for bars, as well as in buying in other directions. Although some sellers have set up quotas for third quarter which are about on a parity with those originally proposed for current period, allotments in general are down somewhat. Cold-drawn bar sellers report a brisk demand for practically all sizes, and have little to offer before September.

New York — Hot carbon bar consumers anticipate little improvement in shipments for some time. Receipts have gotten back to the pre-coal-strike level in most cases, but they have leveled off and, even though the industry may not be disrupted by another coal strike this summer, the general expectation is that bar production will not maintain the present rate during the summer months. Meanwhile, third quarter quotas have been on a somewhat restricted scale, as compared with those originally announced for the current quarter, although actually shipments against the quarter's quotas should be better, assuming there is not another coal strike. Many in the trade, however, regard this as a large assumption.

Cleveland — With some mills channeling substantial portions of their hot carbon bars into cold-drawn bar production the available supply of hot bars is limited. Consequently, the hot bar supply fails to meet requirements. Although demand is strong for all sizes there is particularly heavy pressure for deliveries of rounds and flats up to 1½-inch. The situation is so acute that some forgers have been accepting cold-drawn bars as a substitute for hot-rolled. However, one producer reported it is guarding against deals that require a consumer who wants hot bars to take cold-drawn bars instead.

St. Louis — Demand for merchant bars has been unremitting for many months, with the prospect now that requirements of the atomic bomb program will increase the stringency. Bar tonnage asked of this district is not great, but coming on top of the pressure of railroad car builders, it is likely to set back normal customers still further. Some backlogged orders already are six months old, even though barmakers have accepted no new ones recently. Pressure on bars from farm equipment makers has been especially heavy lately, especially on a half inch and under.

Tubular Goods . . .

Tubular Goods Prices, Page 157

Washington — Federal Power Commission has approved construction of a $151 million pipeline by Transcontinental Gas Pipe Line Co. to bring natural gas from the Texas Gulf coast to the New York-Philadelphia area. The 1840-mile line is expected to be ready for operation by the fall of 1950.

Seattle — Cast iron pipe is in good demand, but many jobs are being deferred because of uncertain deliveries.

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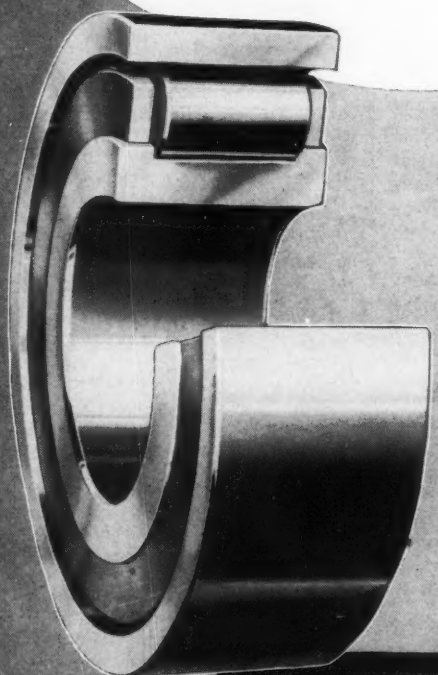

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Tin Plate . . .

9-cent rise on pig tin reduces profit margins on tin mill products

Tin Plate Prices, Page 157

Pittsburgh — Advance of 9 cents to $1.03 per pound on pig tin, effective June 1, was greater than expected by some tin plate producers. This development is expected to further reduce profit margins on tin plate production, particularly for those interests who recently reduced prices. Increase in pig tin prices is roughly estimated at about 11 cents per base box on hot-dipped tin plate. Higher pig tin cost is expected to increase the trend toward electrolytic tin plate. At present most sellers report electrolytic represents about half of the entire output. Some isolated instances are reported of easing in tin plate requirements for such end uses as paint cans. However, this tendency is insignificant in relation to the overall demand and openings in schedules are quickly filled by requirements for other end uses. Most sellers expect to have very little carryover tonnage at the end of this quarter, reflecting generally satisfactory operations during the coal strike and industrial gas shortage periods earlier this year.

Plates . . .

Plate Prices, Page 157

Boston — Although now probably on a reduced scale, there has been more substituting in plate grades than generally realized. This accounts in part for the heavier demand for low-alloy high-tensile steels. While some mills have been refusing orders for this grade for off-pattern application, others are not as particular and a considerable volume has been sold. At times, fabricators unable to get wanted tonnage in carbon plates can obtain low-alloy high-strength stock; on the whole, part of the increased volume in the latter grade may be assigned to availability which in turn may be due to price, there being a differential of $19.20 a ton. Nevertheless, some orders are being turned down for low-alloy high-strength plates if the application is off line. The bulk of carbon plate tonnage sold in this area is on the Sparrows Point base or 3.51c, Boston, with Pittsburgh district producers selling here meeting competition and absorbing slightly higher freight. Plate allocations for this quarter are lower with more tonnage likely to be earmarked for voluntary distribution, similar to the freight car program, over the balance of the year.

New York—By virtue of conservative booking of orders and generally better operating conditions, some eastern plate mills are making progress on their arrearages. One eastern independent now estimates that he will go into third quarter with a carryover no more than a couple weeks' production. However, most are not quite so optimistic and from the way the situation now appears average carryovers will amount to about three to four weeks.

Demand for plates continues extremely active, and mills could almost double their tonnage overnight if they were disposed to take on the necessary additional orders. However, producers adhere to a policy of booking no further ahead than for a quarter and some are accepting orders only on a month-to-month basis.

It is reliably understood that domestic plate makers are now accepting no tonnage for shipment abroad over the remainder of this year and will not do so except perhaps in the case of the proposed Marshall Plan requirements, which are not expected to materialize before fourth quarter.

Meanwhile, one eastern plate mill is devoting its universal mill capacity to the production of pipe skelp. In line with an announcement made earlier in the year, one midwestern mill as of June 1 is no longer producing strip plate, except for the car program.

Pittsburgh — Demand-supply relationship in carbon plates is reported just as tight as that existing in sheets and strip. This is attributed to extremely heavy demand for such programs as: Railroads, line pipe, standby fuel tanks and equipment, barges, heavy industrial machinery and more recently for tankers. This latter requirement probably is tied in with the program to relieve the critical tight supply situation existing in petroleum products. Perhaps indicative of the situation is recent inquiry of Carbide & Carbon Chemicals Corp. for bids involving 2400 tons for oil barges. Substantial upturn in demand for alloy plates also has occurred in recent weeks. Some sellers are reported booked as far ahead as on open-hearth alloy bars.

Philadelphia — Plate demand continues well in excess of supply, although producers are making some headway on arrearages by restricting commitments and by being able to set up operations at a slightly better rate than they had previously anticipated. On an average, they should be able to enter the third quarter with arrearages of no more than three or four weeks' production.

Seattle — Plate shortages are increasingly acute and in some cases hampering plant operations. Management is hesitant in bidding for jobs requiring supplies in excess of potential inventories.

Wire . . .

Wire Prices, Page 157

Chicago — Despite the high-level production, output of wire and wire products falls considerably short of meeting demand. This applies to all types of manufacturers' wire and to the general run of merchant items. As to the latter, inventories of jobbers are low, customers moving out such products as fencing, posts, barbed wire and nails almost as rapidly as new shipments arrive. Wire rope and electrical wire are the only products at a satisfactory level.

Birmingham — Wire products, while remaining prominent on the scarce list, are hardly as stringent as they were a few weeks ago. Some spring wire and nails are available which heretofore were conspicuous by their absence. The need for wire fencing is as great as ever.

Avonmore Furnace Being Operated by Lloyd Steel

Pittsburgh—Operation of the 35-ton basic open-hearth furnace at Avonmore, Pa., by Lloyd Steel Co., Pittsburgh, was scheduled to begin last week. The furnace, a 25-ton acid type, is owned by National Roll & Foundry Co., Avonmore, and is under lease to the newly formed Lloyd company.

Officers of the new organization are: S. W. Specht, president; Carl Nuss, vice president; Walter W. Stevenson, treasurer; and C. W. Wolfe, secretary. Mr. Specht formerly was associated with Youngstown Sheet & Tube Co. as technical advisor to the vice president, operations, and engineer in charge of research and inspection. More recently he was partner in the engineering firm of United Project Engineering, New York.

Structural Shapes . . .

Structural Shape Prices, Page 157

Pittsburgh — Structural fabricators have not been able to make headway against large order backlogs due to limited mill shipments and continued heavy volume of new business. Mills are expected to enter third quarter with substantial carryover tonnage, ranging between four and six weeks in most instances.

New York—Structual buying has improved, although few especially outstanding orders are noted. Considerable work, however, is still pending. Fabricators are booked ahead about five to six months, with certain of the larger shops unable to offer anything under six months. Contributing to extended deliveries is the shortage of plain shapes. Some independent fabricators report the mills are several weeks behind on their commitments, and that, therefore, they cannot maintain anything like capacity operations.

Boston — Considering the high cost of building (and fabricated structural steel cost by no means leads the parade), demand for small-lot tonnage, 100 to 200-ton private contracts, is holding well. Inquiry in this category, supporting most district shop backlogs, is slackening with the ratio higher for public work. Competition for small jobs is a bit keener, but within the limits of mill allocations for plain material. Earlier some shops oversold quotas and paid through the nose for fill-in and other tonnage to meet requirements. High prices are also holding up some heavy equipment contracts requiring structurals; an inquiry for a forging furnace, identical in specification to a unit built in 1945, brought out estimates 60 per cent higher and the inquiry was withdrawn.

Philadelphia — Structural activity in the district remains spotty, with two orders for 925 tons and 850 tons, respectively, outstanding. New inquiry includes little of sizable character. However, most district fabricators are well booked ahead, with backlogs ranging from four to six months. Shape supply remains tight, with some fabricators complaining that mill deliveries are behind schedule.

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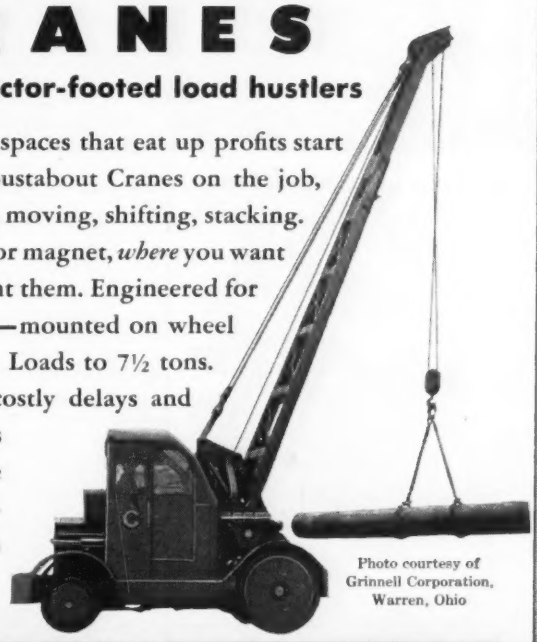

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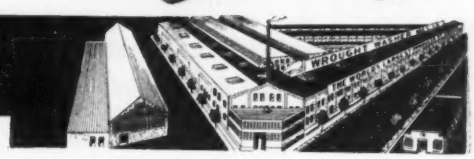

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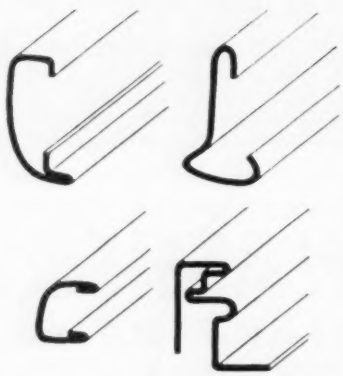

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Oil Company Assures Self of Pipe Supply

Bartlesville, Okla. — Phillips Petroleum Co., this city, is reported to have made arrangements which assure it of a substantial quantity of steel pipe and other oil country goods. It is said the company has guaranteed a note on which Robert S. Kerr, former governor of Oklahoma, and D. A. McGee, Oklahoma oil operator, borrowed $4,125,000 from a Chicago bank to purchase Republic Supply Co., Houston, Tex., from Republic Steel Corp., Cleveland.

Republic Steel Corp. and National Supply Co., Pittsburgh, are reported not to have known, when they made five-year agreements to supply pipe to Republic's former subsidiary, that a major oil company was interested in the supply firm. It was not clear how much of the pipe received from Republic Steel and National Supply would be resold to Phillips.

Republic Steel considered the sale an opportunity to be relieved of a substantial investment in a subsidiary and at the same time maintaining a long-term outlet for a substantial amount of pipe.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 156

Chicago — Demand for reinforcing steel so far exceeds available supply of this material that suppliers choose carefully the jobs on which they submit bids. Most of the projects involve upward to several hundred tons for new industrial plants and additions and a good sprinkling of large apartments. On top of this is a good volume of public work, involving schools, bridges and highway construction. Jobs frequently are deferred or abandoned when it is found that general contract bids run substantially over estimates. Architects and engineers have considerable work on their drafting boards, this indicating that no diminution in reinforcing steel demand is likely for the latter part of this year.

Seattle — Rolling mill production is below normal as the local plant of Bethlehem Pacific Coast Steel Corp. is still closed due to an accident. Operations are expected to be resumed next week. Meanwhile little new business has been booked in reinforcing bars, although there is a steady volume of inquiry in less than 100-ton lots. Mills are hesitant in accepting large contracts at the moment.

Warehouse . . .

Warehouse Prices, Page 159

Pittsburgh — Most distributors report mill receipts during May recorded little, if any, improvement over the preceding period and there is nothing in the supply outlook over the coming months to indicate much change in the pattern of mill deliveries. Warehouse interests report some increase in demand for cold-finished carbon bars and most alloy items. Inventories generally remain unbalanced despite strict allocation of limited steel supplies. Price situation in warehouse steel items continues mixed here, with a 10-cent spread prevailing on nearly all products.

Chicago — The warehouse situation is reminiscent of the war period when too many consumers were seeking their share of an inadequate supply of steel. Inventories are low and unbalanced, and no one is optimistic enough to believe there can be any substantial improvement during the balance of this year. Customers are seeking more than normal quantities in their acquisitions as they seek to offset mill shipments lost as a result of the recent coal strike. Sought most strenuously are flat-rolled products, carbon bars, plates and structural shapes.

Cincinnati—Demand for warehouse steel cannot be satiated at the present level of mill shipments, and these may shrink further under cuts in third quarter quotas. In the acutely short items, such as flat-rolled and structurals, the customers' specifications are flexible to include any stocks usable. Even welding of structural steel, to obtain required length, has been reported.

Seattle — Wholesale jobbers report a good volume of business, all items being in demand, particularly sheets, nails, pipe and reinforcing bars which are still acutely short. Plates also are hard to get. Mill shipments are being deferred and in some instances allocations have been canceled temporarily due to the recent mill shutdown It is reported that aluminum sheets are increasingly short, due to power shortages at eastern plants while western aluminum plants are unable to supply the demand in this area

Rails, Cars . . .

Track Material Prices, Page 157

Cleveland — Passenger car deliveries have been "so incredibly slow" that Chesapeake & Ohio Railway has canceled about one-third of the orders placed in 1946 for the older type of cars and has substituted for these cars C. & O.'s new train "X" equipment, Robert R. Young, C. & O. president announced last week.

"It now looks as though our train 'X' will be experimentally on the rails by the time we could have expected to get the old type that was ordered in 1946," Mr Young said. "The C. & O. is just beginning to get delivery on passenger equipment ordered almost three years ago. Cars which we thought were to cost us only $90,000, in itself a ridiculous price, we now find may cost us nearly twice that sum."

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 158

Pittsburgh — Supply of coke remains critically short and the outlook is clouded by scheduled coal miners' vacation period early in July. Most foundries are attempting to augment inventories to carry them over this period, but their efforts have generally been fruitless. Prices remain steady at $14 to $16.25 for Connellsville foundry bechive coke. Beehive furnace coke is selling within the range of $12 to $14, although some spot sales have been reported at $14.50.

Pig Iron . . .

Pittsburgh Coke & Chemical Co. advances all grades $3 a ton

Pig Iron Prices, Page 158

Pittsburgh — Pittsburgh Coke & Chemical Co. advanced all grades of pig iron $3 a ton, effective June 1. This action was necessary to offset higher freight rates, iron ore and coke costs. As of close of last week other Northern merchant pig iron interests had not yet taken similar action. The increase put into effect by Pittsburgh Coke & Chemical matches that announced by Sloss Sheffield and Woodward Iron around the middle of May.

The iron ore increase alone represents an advance of $1.30 per ton in cost of producing pig iron, company officials state. In addition to above factors, it is pointed out use of blast furnace turnings to increase output has resulted in added costs of $130,000 in past four months.

Some gray iron foundries report substantial decline in new orders and, despite limited production schedules due to shortages of coke and pig iron, are actively seeking new business. Pattern shops have not been busy for some weeks now. No significant improvement in pig iron supply is indicated through most of this year. Pittsburgh Steel Co. has blown in its recently purchased DPC 1100-ton blast furnace, but increased iron available will be used for company's internal operations, thereby substantially reducing amount of scrap purchases.

New York—District pig iron consumers anticipate at least a maintenance of the present rate of shipments throughout the current month, but are concerned about the prospect for July because of the possibility of another strike at the coal mines. They already have accepted as probable that miners will go on a two weeks' vacation starting around June 26 and if the suspension is no longer than that period they anticipate no serious disruption; however it is the possibility of another strike that would keep the mines closed beyond that period that is causing concern.

Meanwhile, interest is being focused on plans for setting up voluntary allocations for the housing program on which a hearing is scheduled in Washington for June 11. Types of cast iron housing products to benefit under the proposed plan are soil and pressure pipe, fittings, radiation, boilers, castings for warm air furnaces, plumbing and drainage products, castings for low water cut-offs and boiler feeders, castings for circulating pumps and built-in water heaters, relief and producing valves, gray and malleable iron screwed fittings, recessed drains and iron body valves.

The proposed program will cover requirements of these products for the construction of residential housing at the rate of 1 million units during 1948 and at the same annual rate during the first two months of next year and also for essential maintenance and repairs of residential housing units.

Boston — Melters of pig iron have

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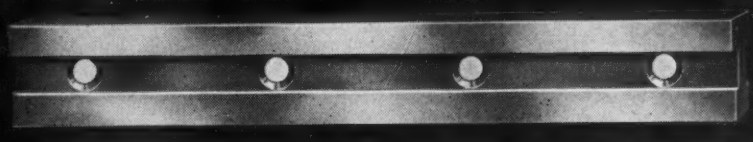

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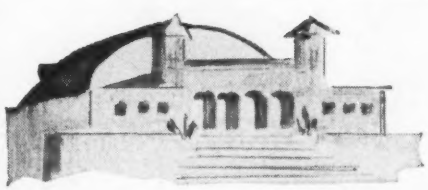

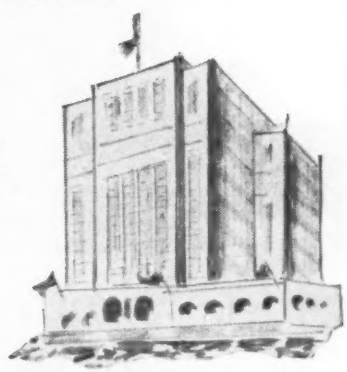

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no appreciable inventories as Mystic furnace production has been spread to do the most good during the last year while that unit has been the major supplier. Shipping schedules are flexible enough to meet sustained high demand for textile mill equipment shops and several of the larger users have increased melt, but with a high ratio of scrap. Some foundries are not being pushed as hard as formerly with some slackening in new orders. While vacation shutdowns are ahead, no extension in iron delivery is asked. Most shops dependent on the Mystic furnace at Everett, Mass., for tonnage are reconciled to a price advance next month.

Philadelphia—While a program is being considered for voluntary allocation of iron to makers of castings required for residential housing, there is no likelihood that the program will affect distribution before July at the earliest. Some sellers here doubt if the program will affect their distribution much at any time as they are already giving pipe makers and others who will supply castings needed for housing tonnage on practically the same basis as they did months ago when a formal arrangement to meet housing requirements was in effect. The Swedeland, Pa., furnace operator is now producing basic but expects to go to foundry iron soon.

Cleveland — Attempting to augment their pig iron supplies, some foundries here are going far afield for tonnage and paying high prices. Some are obtaining Daingerfield, Tex., iron at approximately $87.50 delivered at Cleveland, while others are taking Belgian iron at approximately $99.50 delivered at Cleveland. In preparation for an expected coal miners' strike, foundries are endeavoring to build up stocks of coke also but are having little success.

Chicago — Foundries in this district once more are operating full tilt, or up to the limit of the raw materials situation. Pig iron shortage persists and in some instances stocks of coke are uncomfortably low. Melting schedules are predicated on frequency with which new receipts arrive.

Buffalo—Foundry bookings of merchant iron for the current month call for approximately the same tonnage as the previous month, according to leading area producers. This means the supply will remain tight with many melters continuing to operate on sharply curtailed schedules.

Prospects for early improvement in the merchant iron supply here were dim as one producer kept a stack on silvery iron for steelmaking. In addition, the second furnace at the Wickwire Spencer Steel plant, which has been undergoing extensive rehabilitation, will not be ready for at least another month. Relining of the B furnace at Bethlehem's Lackawanna plant is running ahead of schedule but it will take at least two months to complete the job.

St. Louis — Pig iron consumers are intensifying their search for new sources, with only four weeks remaining before their normal supplier cuts production 50 per cent on July 1 for 60 to 90 days. None have stockpiles of consequence and are having little success shopping.

Seattle — Foundries in this area are hoping for pig iron shipments soon, but expect none before July 1. Columbia Steel is using its pig output in steel production. Kaiser's Provo plant has gone into production and may help to relieve the shortage in this area. Meanwhile local plants, with pig inventories exhausted, are relying on cast iron scrap.

Iron Ore . . .

Iron Ore Prices, Page 158

Buffalo — For the first time in about eight years Republic Steel Corp. has moved New York state iron ore by water from Port Henry, N. Y., to Cleveland. The ore was carried by motor ship the entire route from Port Henry via New York state canals and the Great Lakes. Recent railroad freight rate increases are one of the factors motivating this resumption of ore shipment by water.

Cleveland — Shipments of Lake Superior iron ore from upper lake ports increased to 2,826,645 tons during week ended May 31 from 2,636,274 tons for the preceding week, according to the Lake Superior Iron Ore Association.

Total shipments in May came to 11,609,367 tons, an increase of 1,236,514 tons over the total for May, 1947, and including 11,465,059 tons from United States ports. The cumulative total for the first five months came to 19,286,548 tons, an increase of 4,465,284 tons over the total for the like 1947 period. Shipments from United States ports in this period amounted to 19,094,454 tons this year compared with 14,603,067 tons in 1947.

Birmingham — Sloss-Sheffield Steel & Iron Co. plans to reopen an old ore mine at Gadsden once used by the Japanese government. The mine properties on Tuscaloosa Ave., near Gadsden's business district, have been acquired from the Etowah Coal & Iron Co. The property contains an estimated 5 million tons of red iron ore, rated as the highest grade in the state.

Scrap . . .

Scrap Prices, Page 162

Pittsburgh—Mills continue to accept scrap offerings at formula prices. Steel producers have been buying steadily, although no significant tonnage purchase has been reported in recent weeks. One interest reports that small lot purchases aggregate over 50,000 tons since termination of the coal strike. Increase in No. 2 foundry pig iron price here to $42.50, Neville Island base, partially closes the gap existing between this item and cast scrap. Supply of cast grades appears slightly improved, but quality is below standard.

New York—Movement of scrap has slowed up noticeably as compared with a month or so ago. This is because the excess winter accumulation of material has been worked off to a considerable degree. Local yards, without exception, declare that incoming shipments are off in volume. However, there still is a good movement, with Pittsburgh and eastern Pennsylvania mills taking all the

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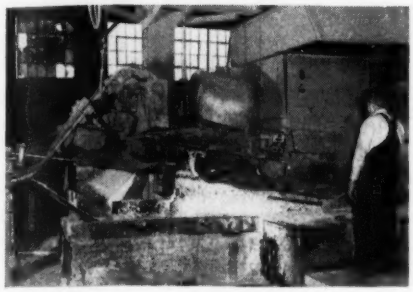

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scrap offered. Meanwhile, New York brokers' buying prices are unchanged throughout the list.

Philadelphia—The scrap market continues on a fairly even keel. Cast scrap prices appear a little stronger in some directions, and while low phos prices are slightly higher at $47.50 to $48, all other steel grades are unchanged. Interestingly, the advance in low phos comes in spite of the fact that the Midvale Co. is holding up shipments because of a strike.

Cleveland—Quiet characterized the market here last week in steelmaking and foundry grades of scrap. Prices continued unchanged. However, it was reported that over-the-formula prices are being paid for scrap for shipment to one mill in exchange for steel.

Continued good flow of scrap has helped mills build up inventories, one mill in this district now having an 80-day scrap supply.

Buffalo — While no new sales of any consequence were reported in scrap last week, a steady to strong undertone prevailed. Dealers reported standing bids at the formula to absorb whatever tonnage was available. Dealers continued to ship against old orders which are based on the formula, or $39.75 a ton for steelmaking grades.

The Valley mill that has been buying substantial tonnages in the midstate area at about $2.50 above the formula has shaded this difference to $1 to $2.

Easier tendencies were noted in the cast market. Prices were off $2 to $3 with No. 1 cupola down to $64 to $65 while regular mixed offerings were changing hands at $60 to $62.

Chicago — A strong tone permeates the scrap market here as steel mills seek to improve inventories. With melting operations at the highest level since exactly one year ago, consumption of scrap is heavy and this, in view of the limited supply situation, makes more difficult the matter of adding to stocks. Pricewise, there has been almost no changes of note recently. No. 1 heavy melting steel holds firmly at $39.50 a ton delivered, other grades following the schedule. Railroad material is still all over the map in regard to price.

Detroit — Prices on open-hearth grades of scrap are quotably unchanged, holding to the formula level, although most brokers and dealers will wink when they say it. Cast iron scrap has shown a flurry of strength, following placement of large Ford orders, originally reported in the neighborhood of 30,000 tons. When the Rouge started to be inundated with cast material from all over the country, some of it in the form of huge castings, it was necessary to call a halt. Obviously, some dealers overshipped their orders and the indication was plain that plenty of scrap was available at a price of around $60 per ton. Resumption of production at all Chrysler divisions this week is counted on to provide added price strength for foundry grades.

Birmingham — Scrap remains in relatively good supply in most cases. Some scrap users say, however, they are receiving inferior material regularly. Except for a 50 cent increase in heavy melting, posted prices remain unchanged this week. Preparation of scrap continues heavy.

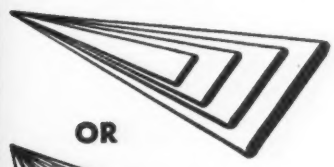
PAGE

Stainless Steel

WIRE

ROUND

FLAT



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—Chip

Since 1865, D. A. Stuart Oil Company has devoted its entire interest to Cutting Fluids and Industrial Lubrication. This experience, plus the facilities of one of the finest laboratories in the industry, are available to help you get the most out of cutting fluids. Be sure to get Stuart's handbook, "Cutting Fluids for Better Machining."

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Canada . . .

Toronto, Ont. — Production of primary iron and steel shapes in Canada totaled 302,902 net tons in March compared with 281,052 tons in February and 282,545 tons in March, 1947. March output included 285,453 tons of carbon steel shapes and 7,449 tons of alloy steel shapes. Production figures for March include 77,821 tons of shapes shipped to producers' own plants or plants within the industry for further processing.

Shipments of primary iron and steel shapes for sale in March totaled 226,748 net tons and included 210,106 tons of carbon and 16,642 tons of alloy steel shapes; for February, shipments for sale amounted to 203,779 tons of which 191,630 tons were carbon and 12,149 tons alloy steel shapes, while for March, 1947, shipments totaled 216,393 tons and included 206,873 tons of carbon and 9520 tons of alloy shapes. Shipments for sale do not include the tonnage that went to producers or plants for further processing.

Shipments of primary iron and steel shapes in March included 10,323 tons of semifinished shapes; 14,895 tons of structurals; 18,645 tons of plates; 25,350 tons of rails; 10,191 tons of tie plates and track materials; 50,018 tons of hot-rolled bars; 13,152 tons of pipes and tubes; 20,251 tons of wire rods; 23,224 tons of black sheets; 7955 tons of galvanized sheets; 10,274 tons of castings; 4796 tons of miscellaneous hot-rolled products and 17,674 tons of all other products.

ASME Meeting Featured By 75 Technical Papers

(*Concluded from Page* 67)

Milwaukee, on modern methods of overhead ...ting and conveying which do not interfere with operations on the floor and which expedite output.

Describes Foundry Experience—At the same session, George W. Zabel, general superintendent of foundries, Fairbanks, Morse & Co., Beloit, Wis., spoke extemporaneously on how the foregoing results are attained in the highly mechanized foundry of his company.

Under W. L. Schneider, vice president, Falk Corp., Milwaukee, a session was devoted to the allied subjects of intelligent handling of human relations, practical patterns for executive action to that end, and a factual analysis of 10 months of the Taft-Hartley Act on industrial relations. These subjects were handled respectively by L. B. Murphy, executive vice president, Williamson Heater Co., Cincinnati, W. S. Ford, president, Wm. S. Ford Inc., Milwaukee, and E. H. Van Delden, director of industrial relations, Libby-Owens-Ford Glass Co., Toledo, O.

In the field of metalworking, E. O. Dixon, chief metallurgist and mechanical engineer, and E. J. Foley, supervisor of physical metallurgy, Ladish Co., Cudahy, Wis., described an extensive series of experiments whereby relative benefits of various pressures and plastic flow can be evaluated in terms of toughness and ductility of forgings.

Cylindrical Grinding — Under the chairmanship of Hans Ernst, director of research, Cincinnati Milling Machine Co., evaluation of cylindrical grinding, and theory and practice of crush dressing in production grinding were discussed on the basis of experimental analysis.

At another machine shop practice session presided over by Joseph B. Armitage, vice president in charge of engineering, Kearney & Trecker Corp., progress reports were made on experiments in distribution of heat in drilling and on effects of cutting speed on temperature, chip hardness and chip thickness. At this session Steve Lindskog told of studies on the economic life of cutting tools at General Swedish Electric Co., Ludvika, Sweden, of which he is assistant to the works manager.

Two formal dinners were held during the meeting. The semi-annual banquet on Wednesday, with Francis J. Trecker as toastmaster, featured Thomas K. Finletter, chairman of the President's Air Policy Commission, speaking on air power and foreign policy. At the University of Wisconsin dinner, held Friday evening, Alex D. Bailey, vice president, Commonwealth Edison Co., Chicago, presided. Guest speakers were the Hon. Julius A. Krug, Secretary of the Interior, Hon. O. A. Rennebohm, governor of Wisconsin, and Edwin B. Fred, president of the University of Wisconsin.

Buyers Told To Expect Steel Purchasing Changes

(*Continued from Page* 67)

future will see even an additional rise rather than a decline. Therefore the steel industry is no longer a place for an entrepreneur with a few million dollars. Rather, invested capital must be calculated in terms of hundreds of millions of dollars."

Gap to Narrow — As raw material and equipment factors lead inevitably to higher costs for carbon steels, the gap between carbon and alloy steels will tend to narrow, he said. Designers will engineer capital equipment and structures with more alloy steel. The trend toward lighter weight and greater permanence will be accelerated. This in itself, he remarked, will result in a series of minor and continuing adjustments. Furthermore, he added, the greater reliance on alloys and

the more functional combination of metals will conserve the thinning resources of the nation.

He appealed to buyers and sellers alike to co-operate fully to the end that the present voluntary control system for meeting priority needs be made a success, without resorting to mandatory controls. Whether present controls under Public Law 395 will continue to work depends, he said, upon the willingness and desire of all concerned to make them work. In his opinion, Mr. Batcheller said, shortages of some steel products have yet to reach their height. Essential programs requiring steel, such as aid to the countries of Western Europe, mobilization, housing, atomic energy and freight cars, must be fulfilled. They cannot help, he said, but widen the gap between supply and demand of certain products still further.

He urged a fair trial for present controls, adding that "we must make them work, for our only other alternative is the creation of a peacetime WPB."

Participants in the steel forum, over which Mr. Syburg presided, were the reporting members of the committee: M. L. Brower, Master Electric Co., Dayton, O.; Nelson J. Gibbons, Motor Wheel Corp., Lansing, Mich.; Robert C. Kelly, Dresser Industries Inc., Cleveland; and H. W. Ledebur, Hammond Iron Works, Warren, Pa.

A nonferrous metals forum was presided over by Russell G. Wenz, chairman, committee on nonferrous metals, and purchasing agent, Philadelphia Co., Pittsburgh.

George W. Wolf, president, United States Steel Export Co., New York, discussed various economic aspects of foreign trade.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2159 tons, power plant, Public Service Co. of Indiana, Noblesville, Ind., to American Bridge Co., Pittsburgh.

1500 tons, apartment No. 2, Amalgamated Houses, Grand St., New York, to Harris Structural Steel Co., that city.

1200 tons, plant addition at Sharon, Pa., Westinghouse Electric Corp., to Bethlehem Steel Co. through Ebasco Services Inc., New York.

1000 tons, power house, Columbus & Southern Ohio Electric Co., Athens, O., to Fort Pitt Bridge Works, Pittsburgh.

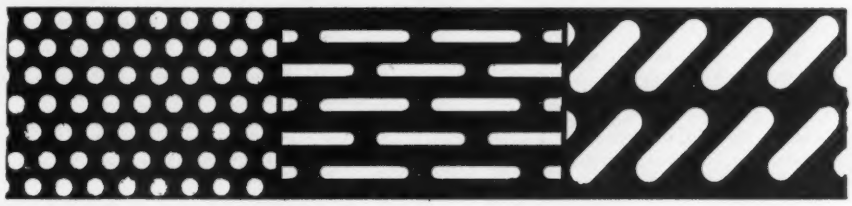
925 tons, state bridge, Delaware county, Pennsylvania, to Phoenix Bridge Co., Phoenixville, Pa.

850 tons, gas generator house, Consolidated Edison Co., Astoria, New York, through United Engineers & Constructors, Philadelphia, to American Bridge Co., Pittsburgh.

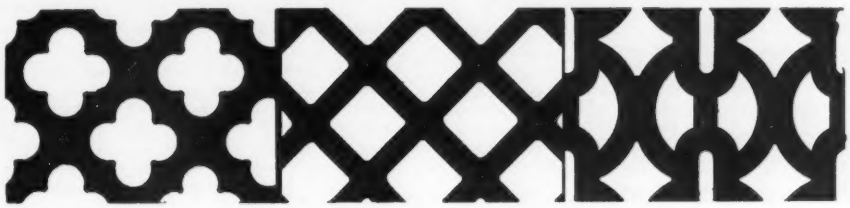
770 tons, Public School No. 111, Queens, New York, to Bethlehem Steel Co.

575 tons, manufacturing and storage building, New Haven, Conn., through Westcott & Mapes, to Bethlehem Steel Co.

500 tons, building, Celanese Corp. of America,



For Whatever Purpose You Need Perforated Metal



Hendrick will fabricate it to your specifications * * * * from any commercially rolled metal * * * in any gauge * * * with any shape or size of openings. Extensive plant facilities, an unsurpassed stock of dies and tools, and more than 70 years' experience in perforating metals, are at your service. Write us regarding your requirements.

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Celconear Narrows, Va., to Bethlehem Steel Co.

450 tons, state bridge works, Franklin county, New Jersey, to Bethlehem Steel Co.

400 tons, grillages for oil wells, Pure Oil Co., Orange, Tex., to Bethlehem Steel Co.

360 tons, telephone building, Manhasset, Long Island, through White Construction Co., to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

315 tons, state bridge, Middlesex county, New Jersey, through the Union Building & Construction Co., to Bethlehem Steel Co.

287 tons, bridge, proj. T 0284(2), Chippewa county, Wis., for State, to Bethlehem Steel Co.

265 tons, warehouse, 18-19 Flushing Ave. Corp., Brooklyn, N. Y., to Bethlehem Steel Co. 240 tons, building, Columbia, Mo., through Luria Engineering Co., New York, to Bethlehem Steel Co.

253 tons, Tri-State Highway, sec. 2425.1 HF. Cook county, Ill., for State Highway Division, to American Bridge Co., Pittsburgh.

220 tons, building, Denny Tag Co., West Chester, Pa., to Bethlehem Fabricators Inc., Bethlehem, Pa.

200 tons, building, Hazelton Electric Co., Little Neck, N. Y., to Bethlehem Steel Co.

193 tons, bridge, sec. 117-1VF, Montgomery county, Ill., for State Highway Division, to Illinois Steel Bridge Co., Jacksonville, Ill.

188 tons, Tri-State Highway, sec. 2626.1 HF, Cook county, Ill., for State Highway Division to American Bridge Co., Pittsburgh.

185 tons, state bridge, Butler county, Pennsylvania, through Johnson, Drake & Piper, to Fort Pitt Bridge Works, Pittsburgh.

175 tons, power house, Tucson, Ariz., to Ingalls Iron Works, Birmingham, Ala.

150 tons, alterations, Reading Railroad Terminal, Philadelphia, through George A. Fuller, to Bethlehem Steel Co.

120 tons, sub-station, Bronx, New York, to Schacht Steel Construction Inc., New York.

115 tons, 1-story garage, Manhattan News Co., 627-645 West 42nd St., New York, through George Hoffman & Sons, to Grand Iron Works Inc., that city.

110 tons, office, Continental Can Co., Chicago, to American Bridge Co., Pittsburgh.

100 tons, bridges ER 11 and 12, Grant county, Wis., for State, to American Bridge Co., Pittsburgh.

STRUCTURAL STEEL PENDING

2800 tons, addition, general hospital, Philadelphia, John McCloskey & Co., general contractor.

2100 tons, state office building, Des Moines, Iowa; general contract jointly to Johnson, Drake & Piper Inc., Minneapolis, and Kucharo Construction Co., Des Moines; bids May 25.

1200 tons, library building, University of Iowa, Iowa City, Iowa; bids taken May 20 rejected.

380 tons, state bridge, Cumberland county, New Jersey; bids June 24.

300 tons, bus terminal, Chicago Transit Authority, Chicago; bids May 20.

300 tons, Memorial Hospital, Cape May Court House, N. J., plans being revised.

Unstated, two cranes for Hungry Horse dam, Montana; Moffit Mfg. Co., Albany, Calif., low to Bureau of Reclamation, Denver, $42,215.

Unstated, radial gates and transfer car, right power plant Coulee dam; bids to Bureau of Reclamation, Denver, June 17.

Unstated, 75-ton traveling crane for Coulee dam machine shop; bids to Bureau of Reclamation, Denver, June 29.

REINFORCING BARS . . .

REINFORCING BARS PLACED

500 tons, Irving Park telephone exchange, Illinois Bell Telephone Co., Chicago, to Joseph T. Ryerson & Son Inc., Chicago; Gerhardt F. Meyne Co., Chicago, contractor.

500 tons, retail store, Sears, Roebuck & Co., South Bend, Ind., to Truscon Steel Co., Youngstown, O.

488 tons, additions to buildings 3 and 4, State Hospital, Ana, Ill., to Laclede Steel Co., St. Louis; Kuehne-Simmons Co., Rantoul, Ill., contractor.

284 tons, apartment building, Illinois Institute of Technology, Chicago, to Joseph T. Ryerson & Son Inc., Chicago; William E. Schweitzer Co., Chicago, contractor.

280 tons, temple, Sinai Congregation, Chicago, to Joseph T. Ryerson & Son Inc., Chicago.

200 tons, Yakima memorial hospital, Yakima, Wash., to Northwest Steel Rolling Mills Inc., Seattle; Yeaman & Co., Yakima, general contractor.

110 tons, building, Farmers Mutual Bank, St. Paul, to Cowin & Co. Inc., Minneapolis; Steenberg Construction Co., St. Paul, contractor.

REINFORCING BARS PENDING

3000 tons, McNary dam project, Columbia river; Tacoma Steel & Equipment Co., Tacoma, Wash., low to U. S. Engineer, Portland, Oreg., $293,471.

1000 tons, hydroelectric plant, Sault Ste. Marie, Mich.; bids to U. S. Engineer, Detroit, Apr 21, rejected.

600 tons, research and development laboratory, Portland Cement Association, Skokie, Ill.; Turner Construction Co., New York, contractor; bids May 6.

500 tons, Irving Park telephone exchange, Illinois Bell Telephone Co., Chicago; Gerhardt F. Meyne Co., Chicago, contractor; bids Apr. 16.

500 tons or more, Public Safety building, Seattle; bids to Board of Public Works, July 15; 15-story $4 million project.

185 tons, addition, Swedish American hospital, Rockford, Ill.; bids May 27.

160 tons, school, St. John the Baptist, Whiting, Ind.; bids June 1.

100 tons, library building, University of Iowa, Iowa City, Iowa; Johnson, Drake & Piper Inc., Minneapolis, low on general contract; bids May 20.

100 tons, library building, University of Iowa, Iowa City, Iowa; bids taken May 20 rejected.

Unstated, Bryant Trewyn junior high school, Peoria, Ill.; bids June 17.

Unstated, Scholtz Memorial hospital, Waterloo, Iowa; bids June 7.

PLATES . . .

PLATES PLACED

2000 tons, five tanks, Brickley Development Co., Bridgeport, Conn., to Bethlehem Steel Co.

500 tons or more, steel pipe and fittings, city water system, Portland, Oreg., to American Pipe & Construction Co., Portland, at $157,188.

475 tons, propane tanks, Union Carbide & Carbon Co., New York, to American Car & Foundry Co., that city.

PIPE . . .

CAST IRON PIPE PLACED

150 tons 6 inch cast iron pipe, for Snohomish, Wash., divided equally between H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J. and Marckmann & Williams, Seattle.

STEEL PIPE PENDING

Unstated, 4600 feet of 12 inch, 3/16 inch, new water pipe; bids to Alma K. Catto, city clerk, Shelton, Wash., June 8.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Chicago & Eastern Illinois, 21 diesel-electric locomotive units, to Electro-Motive Division, General Motors Corp., LaGrange, Ill.

CONSTRUCTION AND ENTERPRISE

CALIFORNIA

LOS ANGELES—Economy Metal Fabricating Co. has been formed with 2500 shares of no par value capital stock by Eugene C. Letts and associates. Firm is represented by Harold Larson, 814 Central Bldg.

MARYSVILLE, CALIF. — Yuba City Steel Products Co. has been formed with a capital of $175,000 by James C. Krone, Yuba City.

CONNECTICUT

HAMDEN, CONN.—Whitney Blake Co., Dixwell Ave., has awarded a $70,000 contract to Joseph N. Rice Inc., 60 Peck St., New Haven, for construction of a laboratory and office.

NORWALK, CONN.—Nordar Corp., Post Rd., will build a $125,000 factory.

ILLINOIS

PROVISO, ILL. — Chicago North Western Railway is constructing with its own forces three additional tracks and other track changes in its yards 6, 7 and 8 here. Cost will be $157,130.

MINNESOTA

MAPLE LAKE, MINN.—Rural Co-operative Power Association plans to spend $68,000 on electric switchgear and substation equipment for an electric generating plant.

MISSISSIPPI

NATCHEZ, MISS.—Mississippi Power & Light Co., c/o Rollin S. Armstrong, will build a $400,000 substation and will spend $300,000 on electric facilities for Southern Johns-Manville board plant.

PASCAGOULA, MISS.—Ingalls Shipbuilding Corp. will construct a $2,310,000 oil tanker for Texas Co.

NEW JERSEY

WASHINGTON TWP., N. J.—F. H. Bahlsing Inc., 125 West St., New York, has awarded separate contracts totaling $70,000 for construction of a warehouse.

NORTH CAROLINA

LEAKSVILLE, N. C.—Hedgecock Brick Co., C. M. Hart, president, plans to build a $100,000 plant for the manufacture of bricks.

WINSTON-SALEM, N. C.—International Minerals & Chemical Corp., 20 N. Wacker Dr., Chicago, will build a fertilizer plant here.

OHIO

CLEVELAND—Master Products Co. is building a $115,000 addition to its punch press plant at 6400 Park Ave.

SCIO, O.—Scio-Ohio Pottery Co. is installing a 400-ft continuous conveyor system linking its shipping department to the railroad spur line.

TOLEDO, O.—Inshield Products Co., 221 Cherry St., has awarded a $150,000 contract to George W. Lathrop & Sons Inc., 1510 Montcalm St., for construction of a die and stamping shop and boiler house at 2031 Manhattan Blvd.

OKLAHOMA

CUSHING, OKLA. — Midland Refinery Corp. plans to remodel and enlarge its facility here at a cost of $500,000.

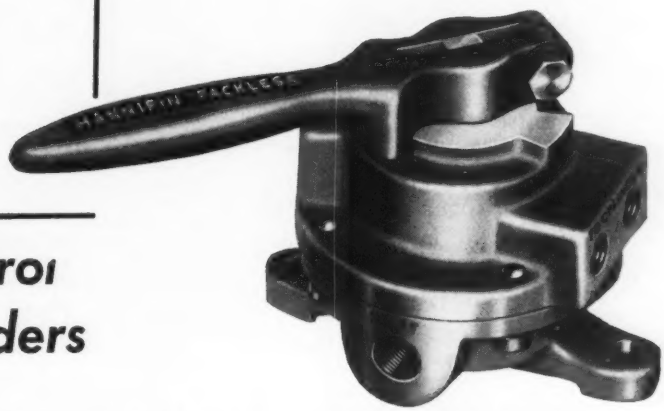
TULSA, OKLA.—Texas Co., Philtower Bldg., plans additions to its West Tulsa refinery at a cost of $1 million.

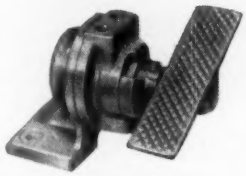
PENNSYLVANIA

ERIE, PA.—Pennsylvania Telephone Corp. plans a $130,000 addition to its plant at E. Tenth and French Sts.

PHILADELPHIA—Moore Products Co., H and

HANNIFIN "PACKLESS" VALVES





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—Sizes, ¼" to ¾".

—3-way or 4-way action.

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For Hand Operation

—20 different models.

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—Sizes, ⅛" to 1¼".

—3-way for single action or 4-way for double action.

—Also electrically operated valves.

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Hyde Park

CHILLED ROLLS and ROLLING MILL MACHINERY

RED CIRCLE Rolls CHILLED

This may be the Atomic Age, but in practice it is still the Steel Age—and one of the constant demands of this age is rolled steel products. To those who juggle rolled steel against prices and markets, superior equipment is frequently the difference between profit and loss. The Hyde Park Foundry and Machine Co. is equipped to design and manufacture individual chilled rolls or complete rolling mill units. Their accumulated knowledge of rolls, rolling mill machinery and procedure is available to all who inquire. Free consultation is part of our practice; you should take advantage of it.

HYDE PARK FOUNDRY & MACHINE CO.
HYDE PARK *(Pittsburgh District)* **PENNSYLVANIA**

Lycoming Sts., will build a $68,000 factory addition.

PHILADELPHIA—Joseph T. Ryerson & Son Inc., 5200 Grays Ave., will build a $68,000 warehouse addition.

PITTSBURGH—Dravo Corp. has received an order from Mississippi Shipping Co. Inc., New Orleans, for 30 welded steel, 277-cu-ft shipping containers.

PITTSBURGH — Elliott Co. has been awarded a $1 million contract to build 40 1100 kw generators to be used in a new plant of Aluminum Co. of America at Point Comfort, Tex.

YORK, PA.—International Chain & Mfg. Co., 459 Norway St., has awarded a $100,000 contract to A. B. Seifert, 702 W. Poplar St., for construction of a warehouse and storage building.

RHODE ISLAND

PAWTUCKET, R. I.—J. S. Electric Motor Co., c/o the architect 188 Main St., plans to build a $68,000 factory on Central St.

TENNESSEE

OAK RIDGE, TENN.—U. S. Atomic Energy Commission will erect approximately 14 miles of chain link fence, including gates, around AEC controlled area. Cost will be approximately $200,000.

RICHARDS CITY, TENN.—Penn-Dixie Cement Corp. plans a $500,000 modernization project at its present factory, to include an addition, repairs and installation of machinery in its finishing plant.

TEXAS

DALLAS TEX.—Forney Engineering Co., 3010 Main St., plans to build a $70,000 factory.

HOUSTON, TEX.—A. J. Bayer Co. of Texas, 2201 Telephone Rd., plans additional plant expansion at a cost of $75,000.

HOUSTON, TEX.—National Cylinder Gas Co., 3205 Harrisburg St., has awarded a $70,000 contract to Robert H. Smith Co., 2301 Telephone Rd., for construction of a plant unit.

HOUSTON, TEX.—Diamond Alkali Co., R. F. Evans, president, Cleveland, has announced plans for a future expansion program here, to include a $14,500,000 plant located on the Houston Ship Channel.

RIO GRANDE CITY, TEX.—Sun Oil Co., M. E. Esperson Bldg., Houston, plans to build a natural gas conservation plant, pipelines, etc., at a cost of $1,675,000.

TEXAS CITY, TEX.—Union Carbide & Carbon Chemical Corp. has awarded a $71,000 contract to R. P. Farnsworth Co. Inc., Box 74, Houston, for construction of a 2-story plant. Linde Air Products Co. is lessee.

VIRGINIA

BOYDTON, VA.—Julius Kayser & Co., 500 Fifth Ave., New York, c/o Williams, Coile & Blanchard, engineers and architects, 403 Melson Bldg., Newport News, Va., plans to build a $85,000 plant.

NARROWS, VA.—Celanese Corp. of America, 2 Park Ave., New York, has awarded a $600,000 contract to George F. Hazlewood Co., Howard St., Cumberland, Md., for construction of a plant extension to Bldg. 1.

WEST VIRGINIA

BELLE, W. VA.—Linde Air Products Co., a unit of Union Carbide & Carbon Corp., 30 E. 42nd St., New York, will build and operate an oxygen producing facility here to supply oxygen to the plant of E. I. duPont de Nemours & Co.

MORGANTOWN, W. VA.—Weirton Steel Co., Weirton, plans a $150,000 project to include construction of a change house and bathhouse.

WISCONSIN

TOMAHAWK, WIS.—National Container Corp. has awarded a $190,000 contract to Tidewater Construction Co., 538 Front St., Norfolk, Va., for erection of a semi-chemical building.

CANADA

BELLEVILLE, ONT. — Canadian Industries Ltd., Beaver Hall Hill, Montreal, Que., will build a $300,000 phenol formaldehyde resin plant.

HAMILTON, ONT.—Proctor & Gamble Co. of Canada Ltd., Burlington St. E., has awarded a $1 million contract to W. H. Cooper Construction Co., Medical Arts Bldg., for erection of seven additional plant units, including machine shop extensions.

ST. THOMAS, ONT.—Timken Roller Bearing Co., Talbot St. E., has awarded a $750,000 contract to Richard & B. A. Ryan Ltd., 927 Eglinton Ave. W., Toronto, for construction of a hardening building.

WINDSOR, ONT.—Chrysler Corp. of Canada Ltd., 300 Tecumseh Blvd. E., has awarded a $1 million contract to Pigott Construction Co. Ltd., Pigott Bldg., Hamilton, for erection of an office.

CAP DE LA MADELINE, QUE.—Canadian Industries Ltd., Beaver Hall Hill, Montreal, will build a $500,000 zinc oxide factory.

PRICES OF LEADING FERROALLOYS PRODUCTS

(*Concluded from Page 159*)

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 8.7c per lb of briquet, c.l. packaged 9.5c, ton lot 10.3c, less ton 11.2c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Eastern Zone, contract, c.l. bulk 8.75c per lb of briquet, c.l. packed 9.55c, ton lot 10.35c, less ton 11.25c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 5.1c per lb of briquet, c.l. packed 5.25c, ton lot 6.7c, less ton 7.6c. **(Small size**—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 5.25c c.l. packed 6.05c, ton lots 6.85c, less ton 7.75c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 17.50c per lb of alloy, carload packed 19.0c, ton lot 19.8c, less ton 20.8c; Central, add 0.5c for c.l. and 0.85c for l.c.l.; Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 16.25c per lb of alloy, carload packed 16.45c, ton lot 19.35c, less ton 20.85c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 8% max., C 3% max.). Eastern Zone, contract, any quantity, $2.90 per lb of contained Va; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l. and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade** (Va 50-55%, Si 4% max., C 1% max.), $3. **High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.

Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. (Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.). Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.

Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, c.l., lump, bulk 6c per lb of alloy, c.l. packed 6.75c, ton lot 7.5c, less ton 8.35c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.40c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Eastern Zone contract, 100 lb or more, 1" x D, $1.20 per lb of alloy, freight allowed. Less than 100 lb $1.30; Central, add 0.75c; Western add 2.9c, freight allowed. Spot, add 5c.

Borosil: (3 to 4% B, 40 to 45% Si), $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Eastern Zone, contract, ton lot, 2" x D, $2.50 per lb of contained Cb, less ton $2.55; Central, add 1.65c; Western, add 6.45c. Freight allowed. Spot, add 10c.

CMSZ Mixes: No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Eastern Zone, carload, 12 M x D, carload packed 17.25c per lb of material, ton lot 18.00c, less ton 19.25c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l., and 3.05c for l.c.l. Freight allowed.

Silcaz Alloy: (Si 35-40%, Ca 9-11%; Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Eastern Zone, carload, packed, 1" x D, 39c per lb of alloy, ton lot 41c, less ton 43c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Eastern Zone, contract, carload, packed, ½" x 12 M, 15.0c per lb of alloy, ton lot 15.75c, less ton 17.0c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed. Spot, add 0.25c.

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 10c, ton lots 10.25c, smaller lots 10.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus: (17-19% based on 18% P content with unitage of $3 for each 1% of P above or below the base) Gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.